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THE MARCH OF EVENTS

MERRILY runs the propaganda for the cancellation of the Allied debts to the United States. After a period of quiet, broken only by Mr. Peabody's pyrotechnical address to the American jury, a period which aroused false hopes that the propaganda was dying out, a new impulse was given by that remarkable document in which forty of the most prominent professors of Columbia University, presumably independent thinking individuals, announced themselves in complete agreement on the most complex and debatable matter of the debts. Since then the question has been kept before the public by various means, university presidents and other estimable persons joining forces with the doughty Chancellor of the British Exchequer and fiery French publicists like ex-Premier Marsal, in an attempt to persuade the American people that they have in some strange and mysterious way committed a grievous wrong—nay, a crime—in asking for even a partial repayment of the huge sums lent by them during and after the war.

So far the country has preserved a commendable calm. It has kept its common sense side toward the propaganda mongers and kept its sentimentality fairly well out of reach. It has managed to retain its conviction that the United States made a very valuable, and probably decisive, contribution to the Allied cause in the World War, and that there is no particular reason why it should be called upon to assume an additional burden of eight or ten billion dollars in order to relieve its debtors of a like amount. It is content to believe that the Debt Funding Commission made all of the concessions which the circumstances called for, and even though it cannot always follow Mr. Mellon's figures it is more willing to accept his conclusions than those of Mr. Churchill and the proponents of cancellation.

Nevertheless, the drive which had its inception in the fertile brain of Mr. Lloyd George immediately after the Armistice, continues in the effort to shift to the shoulders of the American people this additional burden for a war which was European in its aims and purposes, European in its conclusion and settlement, and into which we entered reluctantly.

No new facts or new conditions have come to light to warrant any modification of the American attitude. In fact, the developments of the last year in Europe have furnished abundant evidence of the debtors' ability to pay without the least disruption of their economic life. This new evidence is not mentioned by the revisionists. They simply bring up the old argu-

ments that have been worn thread-bare during the past five years, and, belaboring us for not accepting them heretofore, urge their acceptance now, when they are less potent than ever.

Legalities and Moralities

IT IS CUSTOMARY for the revisionists to admit that legally we are fully entitled to recover the amounts lent, with interest. The Liberty Loan Acts under which the money was raised specified that loans might be made to the governments "engaged in war with the enemies of the United States." The loans were made on this basis, and the various debtors gave their notes for the sums received, the notes bearing interest at 5 per cent. per annum. Mr. Peabody makes a strong plea on the ground that these acts said that the money was for the "purpose of more effectually providing for the national security and defense." From this he argues that the money was spent in our own war for our own security and defense, and spokesmen for the debtor nations have been quick to seize upon the idea that these monies were our "contribution to the common cause."

Mr. Peabody stops his quotation too soon. The Liberty Loan Act provided for raising money "for the purpose of more effectually providing for the national security and defense and prosecuting the war by *establishing credits* in the United States for foreign governments." It is obvious that the United States could contribute to the common cause in three ways: by participating in the fighting; by granting subsidies, that is, by giving money; and by establishing credits, that is, by lending money. Despite the common experience of mankind that the lending of money is a very effective and sometimes salutary method of extending aid, the revisionists ignore it entirely, and insist that because money was advanced to the Allies it could be a contribution only if it was a gift. The United States Government had no money to give. The sum of the gold in the United States Treasury would have been but a fraction of what was needed. But it did have an unimpaired and unlimited credit, the power to borrow dollars by billions from the American people. This the European nations did not have, and it was this credit, this borrowing power, that the United States was willing to and did place at the disposal of the Allied governments. This was its contribution to the common cause.

Yet, we are repeatedly asked to read all of the emotional discharge which took place in the Senate and House when overexcited Senators and Representatives gave vent to their oratorical predilections by making complimentary remarks about the Allies and expressing perfervid hopes that they would never be called upon to repay a cent of the money. A dozen or even a score of such effusions have no pertinence whatever. When Congress got down to passing the law it included no suggestion of this effusiveness; it made a straightforward and simple provision to establish credits in this country for the Allied governments.

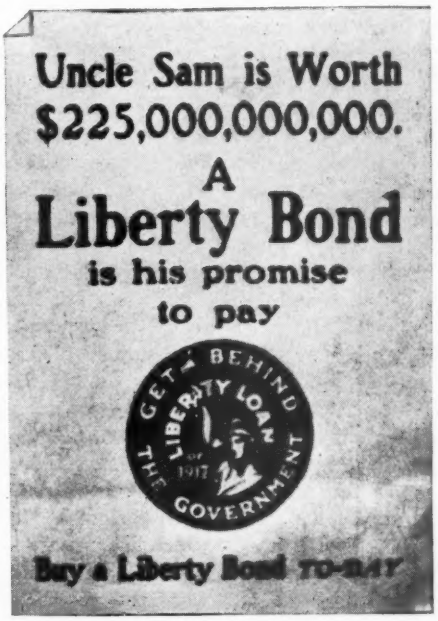
It is true that the loans were not made on a "business basis." No banker with half an eye to caution would have considered them. But to argue from this that they should be cancelled is to argue that because we have shown a measure of generosity we have thereby obligated ourselves to make a clean gift of all the sums concerned. Many of us have been called upon to make loans to friends in distress when they could not secure assistance from banks. But it is doubtful if even the most callous debtor has ever had the temerity to suggest that because the loan was not made on a "business basis" we were morally bound to cancel and return his note.

There may be a measure of sincerity in the contention that there is some moral obligation upon the United States to convert its contribution of credit into a contribution of cash, but it is certain that there is a much greater measure of pure cant, and the most disingenuous argument utterly fails to carry conviction on this score. The most elaborate dialectic has not been able to conjure up any moral obligation of the United States which makes the slightest impression in the scale

against the moral obligation of the debtor nations to pay their debts. No more valid objection can be raised to the claim of the United States on moral grounds than on legal grounds.

Charity and Hate

ANOTHER POINT upon which the revisionists love to dwell is the fact that America is great and rich and prosperous, while its debtors are impoverished. This, of course, is purely an appeal to sentimentality and the charitable impulse of the American people. It is a plea which finds no echo in the debtor nations. They argue volubly on the right and justice of cancelling the debts. They point out the absurdity of a situation where the United States will receive most of the money paid by the Germans on reparations account, and they reënforce their pleas for "justice" by contrasting the wealth of the United States with their own poverty-stricken state. But if they are too proud to ask that the debts be cancelled out of charity should we ask them to accept our charity? If it is insisted that we should cancel the debts it should at least be made clear that it is a matter of charity and not a matter of right or justice.



WHO WILL RETIRE THESE BONDS?

The United States Government guaranteed payment of the principal and interest on Liberty bonds, and if the borrowing nations do not pay off the money lent to them the burden will fall upon the American taxpayer and, in effect, the pledge of our government to Liberty bond buyers will in part be invalidated. One Liberty loan poster reads: "The owner of Liberty bonds can sell at any time and get his money back. The safest investment in the world because it is guaranteed by the United States Government."

Professor Taussig of Harvard unwittingly reduces this plea for generosity to an absurdity. With all the ingenuity of a skilled economist he makes it clear that it is not the huge sum of $10,000,000,000 that we are to receive from Europe, but instead the trifling driblet of $200,000,000 or so a year for sixty-two years. This sum, he points out, is a mere nothing compared with either our national income or our national budget. Therefore, he says, we should be generous, since it costs us so little, and cancel it altogether. In other words, we have been so generous already that we have materially reduced the principal and then extended the time on the remainder from fifteen to twenty-five, and then to sixty-two years. Having thus made the annual payments so small as to be insignificant, we are adjured to cancel them entirely. Generosity grows by what it feeds upon, and the more we do for our debtors the greater our moral obligation to be still more generous.

As a diapason for this curious melody is the threat of portentous things that are to happen to us because of the hatred our legitimate request for repayment has created and is fostering in Europe. So strongly do the European debtors feel our moral obligation to cancel these debts, that our continued insistence upon their payment stirs a hatred of America and Americans which forebodes the direst consequences unless we hasten to mend our ways. Thus the revisionists would add the motive of fear to the moral impulse.

The record hardly sustains their assumption that cancelling the debts would eliminate the alleged hatred. There was no sign of this hate in Europe until the first concessions were made in the settlement with Great Britain. Since then it has grown, and each new concession on the debts has been marked by a new access of "hate." We have made "hating" pay, and the revisionists would encourage "hatred" so that it may pay still more.

If this is attacked as a specious argument we shall be ready to admit the charge, but we shall insist in return that the revisionists admit that their argument that European "hate" is due to the debts is equally specious. The dislike of the debtor for his creditor is traditional. It is a familiar phenomenon as between individuals. Our rôle as a creditor nation is a new one, and after we have played it a while we shall become accustomed to the lack of popularity which surrounds a creditor.

But we should hardly allow the Cassandras in our midst or the European politicians who fatten upon this dislike to put us in panic by calling it hatred. It is a most natural reaction of the "shabby-genteel" aristocracy among the nations toward the blatant parvenu who has suddenly monopolized the international limelight. It will continue to exist as a mild resentment, expressing itself in lack of enthusiasm and cordiality, but otherwise quite innocuous—unless we make it pay. So long as there is that hope, politicians in the debtor countries will whip it into a semblance of hatred, in the hope of securing some tangible benefit. It savors of national blackmail, and paying hush money will be no whit more successful than in personal blackmail. Every dollar we remit on the debts, with the intent of assuaging European "hatred," is a direct invitation to double the hatred in the hope of getting two dollars off next time.

Economics and Economy

THE CAUSE of all of this "hatred," according to revisionist dogma, is the "crushing load" of taxation which it forces upon the peoples of the debtor nations. Now, $10,000,000,000 is a great deal of money, and when it is divided up per capita among the peoples of the debtor nations it makes an individual indebtedness of some $50. This in truth is staggering, but, as has already been pointed out by the revisionists, the United States is not receiving $10,000,000,000; it is receiving annual payments of about $200,000,000, or $1 per capita of the population of the paying countries. It is by using the first set of figures in one case and the second set in the other that the revisionists have posed the dilemma which has puzzled so many who have tried to follow their arguments: namely, that what the 100,000,000 people of America are to receive is such a trifling amount for them that they could easily afford to write

EUROPEAN BUDGETS

(*In millions of dollars*)

Year		Total national tax receipts	Total state and local tax receipts	Total national, state, and local tax receipts	Total national expenditures	Military expenditures	Average annual payments due U. S.
Great Britain	1926–7	$3,224.1	$783.3	$4,007.4	$4,090.8	$566.9	$179.1
France	1925	1,272.7	149.2	1,421,9	$1,681.6	305.3	110.4
Italy	1925–6	595.1	137.2	732.3	819.9	174.5	38.8
Belgium	1925	136.5	28.4	164.9	337.4	40.0	11.7

it off, and the amount that the 200,000,000 people of Europe are to pay is so enormous that it will result in crushing their economic life. But no amount of mathematics can get away from the fundamental fact that if the 100,000,000 people of America are annually to receive only $2 apiece from the debt payments, the 200,000,000 people of Europe are annually to pay only $1 apiece, a sum which can hardly be accurately described as a "crushing load."

An examination of the budgets of the debtor countries makes the claim that we are "crushing" them under a load of debt payment still more absurd. In Great Britain, the debtor which is paying nearest to the par value of its debt, the average annual payment is equivalent to 4.3 per cent. of the national expenditure. In France it is 6.5 per cent., in Belgium 3.4 per cent., in Italy 4.7 per cent. This is the customary way of showing the percentage of the debt burden when that percentage is called for. But such figures greatly exaggerate the actual burden. The national budget is only a part of the annual tax bill of the people of the debtor nations. Local taxation is a large item. Also, there is no reason whatever why the *average* annual payment due the United States should be balanced against the *present* tax income. The *average* burden for the sixty-two years is two or three times the present burden, but the average payments can be properly applied only to the *average* income for the same sixty-two years—an unknown figure.

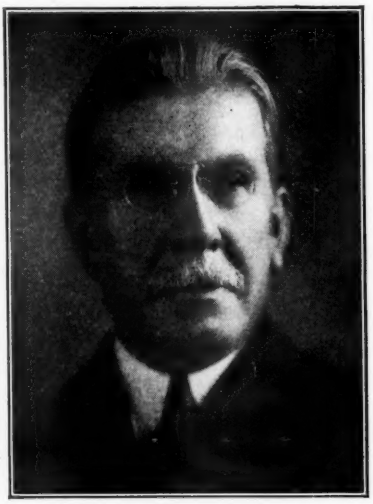
The only figures which have any relations to the *present* budget are those for the *present* payments. When these figures are compared to the total national, state, and local tax receipts, we find that the percentage of taxes necessitated by the payments to the United States is as follows: Great Britain 4.0, France, 2.1, Belgium 0.6, Italy 0.6. It can hardly be seriously contended that a reduction of the national budgets of the debtor countries by these small percentages would relieve the taxpayers of a "crushing burden." The actual annual reduction which might be made if the American debts were cancelled would actually be from 0.6 to 4 per cent. of the existing tax burden.

WINSTON CHURCHILL
The British Chancellor of the Exchequer who has challenged the accuracy of Secretary Mellon's debt figures.

We say "might" be made, because there is no shadow of assurance that if the debts were cancelled there would be any reduction whatever of the tax burden in the European countries. They are, without exception, spending vastly larger sums for military purposes alone than they are to pay to us under the debt settlements. Great Britain, for every dollar she pays to us, spends $3.52 on her military establishment. The British have increased their annual military expenses over the pre-war figure by $40,000,000 more than their annual payment to us. Czechoslovakia, for every dollar she pays to us, pays $16 for military purposes. Poland could pay her whole debt to us out of her military expenditures for three years. Rumania could do the same thing in less than a year and a half. France could do the same thing in five years, if she paid the present cash value of the debt. Two and a half years of Italy's armament expenditure would pay the present cash value of her debt under the present settlement. It is hardly sensible to argue that 2 per cent. added to the total tax burden of the European debtor peoples is "crushing" them, while they are able to spend from three to ten times as much for their elaborate armaments as they have to pay to us. At least it would be commendable

caution on the part of the United States to have assurance either that the "crushing tax burden" would be reduced by the amount of our remissions, or that the amount would not simply be added to military expenditures.

The extremely small budget percentages also throw light on the charge that "capacity to pay" is an unjust measure for settlement. To be sure, the Columbia professors confine themselves to saying that capacity to pay "rings hard and heartless." It may, if it is distorted to mean insistence upon the last cent obtainable. But it was used in no such sense by the Debt Funding Commission. In arriving at the settlements with the various countries the criterion used was capacity to pay without disruption of the normal economic life of the country. Not only did it allow for the carrying on of the present economic activity, but for its normal growth and expansion. To the commission the phrase meant capacity to pay without injury. It is only the revisionists who have distorted it to mean capacity to pay to the last cent.



HENRY BERENGER OF FRANCE

Formerly ambassador to Washington, who negotiated the funding of France's war debt to the United States, as yet unratified, although a payment has been made.

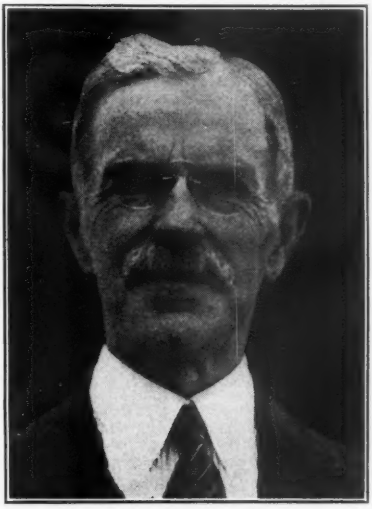
With regard to armament expenditures it is urged that it is much easier to pay large sums within the country than it is to transfer much smaller sums to an outside creditor. This is true, and all of the debtors have made strong arguments regarding their inability to transfer such huge sums without damaging their own currency. M. Caillaux, when he came over to this country last year and attempted to make a settlement of the French debt, refused to consider an annual payment of more than $26,000,000, alleging that this amount was the largest possible sum which could be transferred to another country without irreparable injury to the franc. The negotiations fell down, but under Senator Berenger's agreement France has made an initial payment of $30,000,000.

Time and Uncertainty

FINALLY, it is urged that sixty-two years is altogether too long a time for any semblance of accuracy in estimating what the debtor countries will be able to pay. The tremendous changes in the economic life of the world which have taken place during the last fifty years are cited as evidence of the uncertainties of such a period. But, curiously enough, all of these tremendous changes have been in the line of development, development on such a scale that it dwarfs even the large sums involved in the debt settlements. That is, if the debtor countries had assumed a proportionate burden of debt fifty years ago they would long since have paid it off and forgotten about it. Yet it is insisted that because we cannot tell what will happen in the next sixty-two years, we should cancel or at least further reduce the debts now. As if to give the lie to these very arguments Europe has during the past year made such tremendous strides forward, both politically and economically, that there is every reason to believe that within a decade, if not less, the burden of the debt settlements will become so light that even the most energetic politicians will have difficulty in stirring up "hatred" on that account. In other words, whatever uncertainties there may be as to the next sixty-two years, not only the history of the last fifty years, but the post-war developments in Europe itself indicate that the European debtors will be increasingly able to meet the payments on their debts.

If the rising economic tide should ebb and leave the debtors high and dry there will then be ample time to compare their situation with ours, and if our prosperity is so disproportionate to theirs we can then, quite as well as at present, make such reductions as appear desirable. Meantime, there seems no pressing reason to transfer the debt burden to the shoulders of the American people. The same sixty-two years must pass over their heads and they will carry the same uncertainties.

The exchange of courtesies between Mr. Mellon and Mr. Churchill in May brought out another matter of the highest importance; that is, that after next year all of our principal European debtors—which includes all those to whom loans were made during the war—will be receiving on war debts and reparations from Germany more than enough to cover their payments to the United States. There is some doubt about this in the case of Italy, but in the cases of Great Britain, France, and Belgium it is clear. In the first instance the money comes from Germany. Germany next year reaches the maximum payments under the Dawes plan, with a total of $595,500,000 payable to our four principal debtors. These four debtors pay to us at the maximum $385,600,000 a year, leaving nearly $210,000,000 a year of reparations money in their hands. It can hardly be expected that if the United States cancelled the debts due to it Germany would continue to pay these huge sums to the Allies. Yet on no other basis would a reduction or cancellation of the debts work any benefit to the debtors. If the German reparations bill was reduced dollar for dollar with our debt remissions it would not affect the taxpayers of Great Britain, France, Italy, and Belgium in the least. It is inevitable that the hue and cry for cancellation, if it is successful here, would at once turn to relieving Germany of her payments, with the net result that the American people instead of the German people shall pay this additional sum toward the cost of the war.



JOHN GRIER HIBBEN

The president of Princeton University is one of the most outstanding spokesmen of those critics of our foreign debt policy who would cancel the war debts.

The German Nationalists, in their attacks upon the Dawes plan, have unwittingly clarified this issue. They say: "If it were not for the Dawes payments, our troubles would be over." But why would they? If revisionist argument has relieved Germany of part of the blame for the war, a large share remains and there seems no logical reason why the German people should be spared a tax burden similar to that which all the Allied peoples—ourselves included—must bear. Certainly there is no shadow of obligation upon the American people to assume this burden for them.

It is, of course, quite possible that even without revision of the debt settlements Germany will default on part or all of the Dawes payments, but she can default to the extent of approximately 35 per cent. and still be paying to our principal debtors all that they have to pay to us. In any case, if and when Germany defaults there will be ample time to make any further revision that seems desirable.

For the present there seems to be no possible reason other than unthinking sentimentality for making any revision of the debt settlements as they stand. The validity of the obligations is unquestioned, and the moral contention is sheer hypocrisy. The tax burden is a small matter, and would be quite as real for the people of America if it were transferred to them. The economic evils are largely invention.

And as for possible future catastrophes there is plenty of time to take care of them when they become more tangible. For the present it would be a gross injustice to convert our credit contribution into a cash contribution and to make the American people foot the bill.

Third Term Bogeys

THE "THIRD TERM" TRADITION of the Presidency has never touched the office of Governor of the various states, or, indeed, of any other elective office in the land. Governor Hunt of Arizona is now serving his sixth two-year term, as told in more detail in the article on page 433 of this issue. That seems to be the record term of service among Governors now holding office, but it is not a record among American Governors of the past. Several served twelve years or longer.

Governor Smith of New York is now serving his fourth two-year-term, as is Governor Pothier of Rhode Island. Governor Ritchie of Maryland is another "third term" Governor, having served one four-year term, one three-year term, and is now starting another four-year term, the difference in the terms being due to a change in the state constitution.

Most of our states have had "third term" Governors who have been chosen thrice in their own right. John T. Gilman in New Hampshire was elected to fourteen one-year terms and John Langdon was elected to eight one-year terms. In Illinois Richard Oglesby was elected to three four-year terms. Arthur I. Boreman's term as Governor of West Virginia, with three elections, covered a period of less than six years. In Michigan, Minnesota, North Dakota, and Wisconsin two or more Governors were elected to three two-year terms in each state, and Wisconsin has had one fourth termer. Nebraska and some other states have also had "third termers." In the early days of the Republic it was not unusual for Governors to serve ten years or more.

In some states political machines have held Governors in office for long periods, but in most cases long-term Governors have been efficient. Two conspicuous examples of the efficiency of these long term Governors are Smith of New York and Ritchie of Maryland. They are better Governors now than they were in their first or second terms, and the voters in their states have reëlected them on their records. Fortunately, no tradition has grown up either in New York or Maryland which will prevent those states from having their Smiths and Ritchies as long as they remain good Governors.

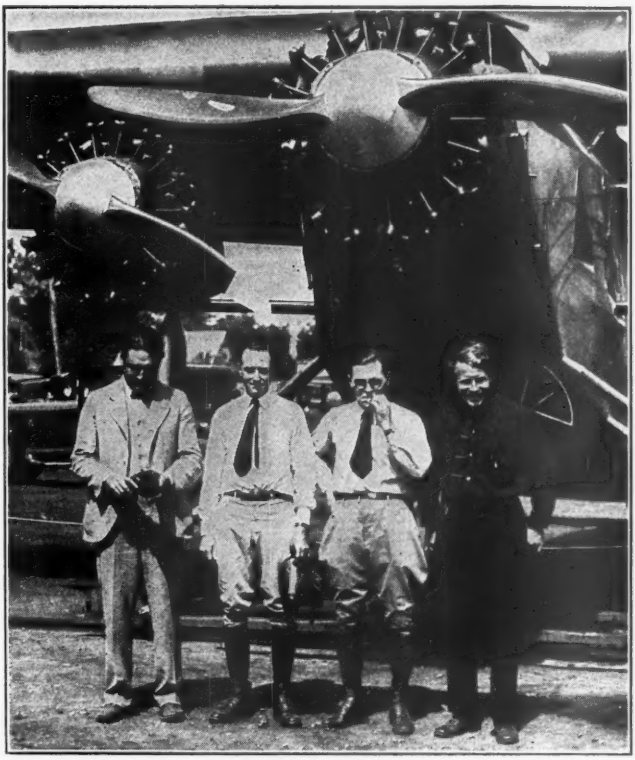
American Ascendancy In Aviation

IN THE SPACE of forty-two days, three airplanes have flown across the Atlantic from the United States to Europe, and it is not unlikely that, before the summer ends, other flights will have been made from Europe to America. These three flights and the remarkable hop from San Francisco to Hawaii were made by American flyers in planes driven by American motors of the new air-cooled type which gives promise of superseding the water-cooled type. Remarkable as were the achievements of our planes and flyers, it must be remembered that both the British, the French, and the Italians have some remarkable distance flights to their credit, and we cannot assume too readily that we can maintain the leadership which seems to have come to us, temporarily at least, by virtue of four great air journeys over the water.

In June, 1926, the Arrachard brothers made a non-stop flight of 2,700 miles in 26½ hours from Paris to Basra, Mesopotamia. In July, 1926, two other Frenchmen flew 2,937 miles from Paris to Omsk in twenty-nine hours. In October, 1926, Coste and Dignot flew 3,415 miles from Paris to Djask, Persia, in thirty-two hours. All were remarkable distance flights. Nor have the British been idle. Sir Alan J. Cobham flew 26,000 miles from London to Melbourne and return in the latter part of 1926, and several months previously flew in the same plane from London to Cape Town, a distance of 16,130

miles. The Italian, De Pinedo, also hopped the Atlantic on its narrow southern reaches, and Commander Franco, a Spaniard, early this year flew with three companions from Spain to Argentina, a distance of 6,320 miles, in an elapsed time of somewhat less than three weeks.

Thus, it may be seen that not only in America is the development of the airplane for distance flights going on at rapid pace. The intrepidity of our aviators and the superiority of our motors have given us the ascendancy, and with the public support and encouragement why should not this nation develop in this new means of transportation the leadership which its clipper ships once enjoyed upon the seas? Other nations are not idle and we shall have to keep extremely busy if we are to stay in front in the close competition which is sure to characterize the international striving for supremacy in aviation.



THEY GATHERED SCIENTIFIC DATA ON A RECORD FLIGHT

Commander Richard E. Byrd's three-motored Fokker monoplane *America*, after battling storm and fog for the great part of its 43-hour transatlantic flight, landed in the sea at Ver-sur-Mer, France, on July 1st. Left to right above are: Bert Acosta, pilot; Commander Byrd; Lieutenant George O. Noville, flight engineer; and Bernt Balchen, pilot. They flew approximately 4,000 miles.

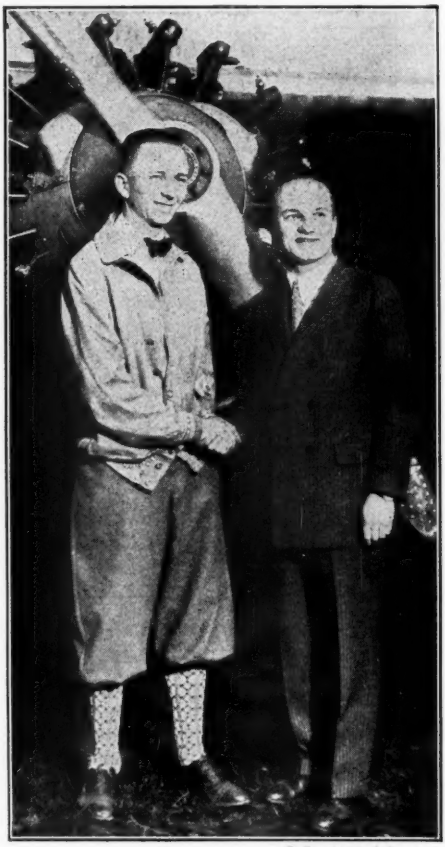
What Aviation Needs

IT IS APPARENT already that Commander Byrd's great flight has been of great value in the development of aërial navigation, as he and his patrons intended it should be. First, it disclosed the need of more perfect instruments not only in planes but also at landing fields. In a night of terror over fog-obscured France, the pilots in the *America* could see no aërial beacons or signals and they had no means of ascertaining their position after they had lost their bearings. A ship nearing port in a fog can lay to, but an airplane must keep on traveling. One solution to the question of beacons which can pierce fogs has already appeared. American scientists think they have it in the neon ray which, it may be hoped, will be speedily developed.

Radio will also play a large part in the development of a system of navigating planes over the sea, and already two British officers have developed a new method of directional wireless for the purpose of assisting airplanes to a safe landing in fog and darkness. It is based in part upon the system of directional wireless now used to guide steamships through dangerous channels in fog, and is thus de-

scribed in a recent issue of *The Illustrated London News*:

The essential feature is an electric cable, charged with high-power alternating current, which is buried in the earth around the aërodrome, and has a landing "straight" across the middle of the ground. Already "leader" cables have been successfully used to guide ships across a channel or into port. The same type of cable is used here for guiding aircraft. It forms a gigantic loop. As the machine comes over this loop, the current from the cable is received on coils in the fuselage. The current from these coils goes through a relay and then operates lights in front of the pilot. When the machine is some distance to port of the cable, there will be considerably more port lights showing than starboard; then, as he gets nearer over the cable, the lights will tend to equalize, and become quite equal when he is directly over the wire. The center light will also glow, not only telling him that he is directly over the cable, but giving him his height above ground. As he circles round and round over the cable, slowly descending, his center lights give him his height, and every time he comes over the starting-point of the landing straight he receives a special signal. When low enough to land, he comes round until he receives a final signal from the entrance to the straight, and, even if he cannot see the ground, he knows that it is safe for landing, and descends until his wheels touch earth. The device was invented by Major G. McAlpine, of the Air Ministry, and Captain H. Cooch, of the Royal Aircraft Establishment, Farnborough.



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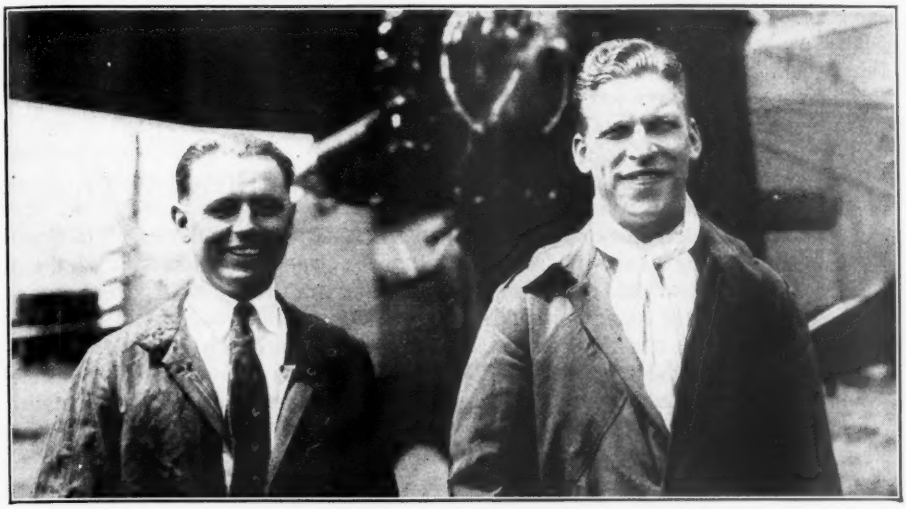
FIRST NEW YORK TO GERMANY FLYERS

Clarence Chamberlain, pilot, and Charles A. Levine, first transatlantic airplane passenger and owner of the Bellanca monoplane, hopped off on June 4th on a 43-hour flight of approximately 3,905 miles. Lack of fuel forced them down at Eisleben, Germany, when almost at their goal, Berlin. Colonel Charles A. Lindbergh in his New York to Paris flight covered 3,610 miles in 33 hours and 29 minutes.

Byrd was over Paris in the fog and storm and he could have landed if a neon ray had guided him within the radius of a wireless apparatus like that invented by the English officers—assuming, of course, that his ship had been fitted with reception apparatus, as all planes will be when transatlantic flying becomes regular. The experiences of our night air mail fliers in this country, as described in an article in this issue by Howard Mingos, disclose the need of both better beacons and directional radio. In fact, rapid development awaits those mechanical aids, and our own Bureau of Standards and other governmental agencies are trying to supply them.

Study of meteorology must and will develop new ways of avoiding bad weather and using air currents to best advantage in transatlantic flying, as well as in other distance flights. Already it is apparent that Commander Byrd's flight has added to this branch of knowledge and, in fact, his misfortunes promise to add more to scientific knowledge than would have a comparative fair-weather trip, such as the



THEY MADE THE LONGEST NON-STOP OCEAN FLIGHT

Lieutenants Lester J. Maitland (left) and Albert F. Hegenberger on June 29th completed a 2,400-mile Pacific hop from Oakland, California, to Honolulu, Hawaii, in a three-motored army Fokker monoplane. Their time was 25 hours and 50 minutes.

intrepid Lindbergh had. It is also highly probable that a considerable addition to this field of knowledge may be made by Professor William H. Hobbs, who is studying storms and other atmospheric conditions in Greenland on the theory that most of the bad weather in the Atlantic originates in the north.

The large experience in such a short period shows that it is not unlikely at the present rate of progress that we shall realize Commander Byrd's prophecy that regular transatlantic flying will be a reality in ten years. As Commander Byrd pointed out in an article entitled "In Defense of Stunt Flying," in this magazine in November, 1926, nineteen years elapsed between the sailing of the first steamship across the Atlantic and the institution of regular steamship service. The *NC-4* and Alcock and Brown made their first crossings in 1919, and regular service is predicted for 1937. We are not doing so badly with our airplanes, after all.

Hunting a Safe Airplane

NOTWITHSTANDING the popular acclaim for recent feats in aviation and the steady development of the United States Air Mail Service to a stage where private enterprise can now see profits in air transport, the airplane remains to most of us a rather dangerous vehicle. Accidents from time to time tend to keep us skeptical toward flying. While we do not condemn the locomotive when we read of a train wreck, nor the steamship when we learn of a disaster at sea; nor do we abandon motor cars in the face of thousands of fatal accidents each year, still we are suspicious of aircraft—and every accident in the air enhances public doubt and thus retards the popularity of aviation generally. Obviously, the reason lies in the acceptance of the idea that terrestrial vehicles are inherently safe while the airplane distinctly is not.

The logical way to overcome this public fear is to prove that airplanes can be made as safe as any other means of swift transportation, and that is what the Daniel Guggenheim Fund for the Promotion of Aëronautics is trying to do in its safe-aircraft competition, which opens to competitors here and abroad on September 1st, and closes on October 31, 1929. The first prize of $100,000 goes to the plane which shall demonstrate various qualities combined in that one machine.

In formulating the rules officers of the fund have been guided by the lack of certain qualities in the average airplane. Landing speeds are now too high. Planes now require too much ground for taking off or landing. They glide into a field at too flat an angle, on occasion making it impossible to clear obstructions or to land at a certain safe spot. They do not climb fast enough, making a take-off dangerous where it is from a small field with obstacles in the vicinity. If the plane is "stalled," or loses flying speed, it generally becomes unstable, the pilot loses control, and the result is a crash. Some planes now possess certain excellent qualities but lack others. The object is to produce a combination, a plane that will fly both reasonably fast and slow, as the pilot may desire; one that will climb at a steep angle, but that will control itself if it loses flying speed.

Aircraft engineers—scores of them are now working on plans for machines to compete in this contest—say that the requirements for a safe flying machine are not beyond possibility, that there is no scientific reason why such an airplane should not be produced, one that will remain as steady as a motor car on the road, even if the pilot removes his hands from the controls, one that shall not tip over and slide off on one wing into a spin and consequent crash, and that will land slowly enough to prevent injury to the occupants, even though the engine stops in mid-air.

Admittedly it is a big order, but the lure of such a contest is inspiring enough to produce wonders. For the winner of the safe-aircraft competition will not only win $100,000. His machine will be labeled safe, officially safe and inherently sound, almost fool-proof in fact. Such a reputation will assure thousands of orders overnight. The orders will warrant quantity production and reduction in prices. The creator of the popular airplane will take his place among those geniuses who have made transportation on a large scale safe, economical, and widespread, with the added distinction of having popularized air travel.

The result of the competition will be awaited with intense interest, particularly by those who appreciate what air travel really means to all of us. Once popularized, it may revolutionize human existence to an extent equalled only by the development of the motor car.

Standing Firm at Geneva

THE AMERICAN DELEGATION went into the Geneva conference on naval arms limitation with a definite program and, standing by that program as they have, our representatives at this writing seem likely to come away with an agreement that will prevent huge armament burdens and at the same time will provide for adequate defense.

The British, who were ready to concede parity to us at the Washington Conference in 1921 when we had plans for the world's greatest navy and when parity meant destroying our ships, sought to reduce us from parity at Geneva in 1927 on the ground that we did not need a navy equal to hers. But the American delegation stood firm for equality with Great Britain, and the editorial and individual comment seems to indicate that the people of this country would take nothing less. The people of this country are acquiring a knowledge and understanding of our new position and responsibilities much more quickly than had been believed possible, and one sign of a new state of the public mind is seen in the new attitude on the Navy. If an acceptable agreement does not come out of the deliberations at Geneva, there is no doubt that American public opinion will call upon the government for an extensive naval building program. Signs of that determination appear throughout the country.

Roadside Markets

BETWEEN TWELVE and twenty million "tin can tourists" are educating and refreshing themselves this summer by motor-camping along the broad highway. But how many million more, who shudder at the thought of sleeping anywhere but between their own cool white sheets, have from their cars seen signs like

this: "Peas, beets, beans, squash, apples, cider, and honey. Fresh Eggs, 35cts."—and seeing, have bought? Those of us who dodge automobiles in town may view with alarm the swollen production of our automobile factories, but not so the small farmer. He has put up his own little market at the roadside, where each year increasing thousands from town and city come to buy his freshest produce. These roadside markets are becoming a national institution, bringing back the direct touch between farmer and consumer which the Industrial Revolution took away.

Naturally, there are some whom this displeases: the middleman and retailer of groceries. However that may be, the people of our towns and cities, who have to pay what the merchant demands nine months of the year, will have scant sympathy with his new summer problem. They see in this already immense roadside business a healthy counterpart of that return to the open air to which the automobile has driven us. And they rejoice to get really fresh eggs and vegetables without paying half a dozen persons for carting them from the farm to their door.

Are We Going To the Dogs?

ARE WE GOING to the dogs? Many investigators warn us that we are, for, they say, some of our ablest women go to college and college women either do not marry or else, when they do, they have very small families. And others of our ablest women go into industry or into the professions and then, in Sir James Barrie's words, "will not let marriage interfere with their careers." And amongst those that do marry the abler and more successful are apt to have fewer children than the less successful. The abler strains of blood, then, are growing relatively smaller all the time.

On the other hand, modern sanitation, social hygiene, and organized charity are preserving many of the less successful who used to fall by the wayside. The death rate amongst the well-to-do has decreased slowly. The death rate amongst the poor has decreased very rapidly, while the birth rate amongst the poor keeps up and the birth rate amongst the well-to-do goes down. This is not a very encouraging picture. But there are mitigating facts.

In the first place, when we say that the ablest and strongest-minded women are those that go to college and into industry or the professions we may be deceiving ourselves. It would be easy to do, for there are no records of ability for women who raise families, whereas the record of a woman who teaches in a college, runs a small business, or writes a book is known.

Perhaps the men and women who choose the easier and simpler task of making a living for one, instead of joining some one of the opposite sex to make a living for from two to six or more—perhaps these people lack elements of character which more than offset their brains and acquisitiveness. People who raise large or even moderate-sized families must love something besides themselves. It cannot be a purely selfish occupation. If in doing that they sacrifice some of the goods of this world which their childless neighbors acquire, they may have the satisfaction of knowing that in the long run their families will inherit the other man's wealth, for it can't go to families which expire.

Our standards for judging ability are still extremely crude. For example, between 1725 and 1825 Virginia produced about as many outstanding figures as did all the rest of the country put together. Conditions then began to change not only in Virginia but all through the South. The blood remained the same, but the conditions changed. The country depended upon slave labor and consequently did not want machines. Elsewhere in the country thousands of men showed ability by inventing things. In the South, practically none. The era of slavery, of Reconstruction, and the era of ignorance that followed Reconstruction are about ended. During that hundred years the South produced only a few men rated as especially able—a few men in politics, and her military commanders in the Civil War.

But under the changed conditions of the present, while the environment is still far less favorable for invention, industrial success, or intellectual success than elsewhere, the percentage of men from the South recorded as possessing ability is rapidly increasing. Here is a test on a grand scale of the relative importance of heredity and environment to produce men and women who will rank as able or distinguished in our records. A superficial look at the situation would lead one to suspect that what we rate as ability is very largely affected by environment and that we have no more isolated and recognized in a scientific manner what ability is than we have established a scientific definition of good character or temperament or a method of determining to what degree an individual possesses them.

Until we become a little more certain of what traits we desire in a population to make a permanent and happy civilization, we ought not to be unduly despondent about the dangers of not getting them. If, however, there is any way of encouraging students of heredity and social affairs so that they may get their sciences to a point where we can safely rely upon them for political or social action, there is nothing more important for us to do than this.

What May Happen in Science This Year

By E. E. Free

THE GREATEST scientific discoveries are usually accidental. There were two such in the last generation: Röntgen's discovery of X-rays and Becquerel's discovery of radioactivity. Neither was expected; both discoverers were far more astonished than was any one else. To predict such of these sudden explosions of new knowledge as may beset us this year is as impossible as it is to foresee a broken leg or any other freak of chance. Some important fact may fall on some quite ordinary scientist during the next twelvemonth and make him into a discoverer, but there is no way of guessing either the victim or the missile or of insuring our textbooks against the resulting revision.

The activities of a would-be prophet must be confined, therefore, to another and less spectacular group of scientific advances, those which result from trends long evident and aided by many men. Such a trend it was which led us to the electric dynamo. A more recent one gave us radio. There are still arguments about who invented dynamos and when; about whether it was Marconi or Righi or Hertz or Popoff or long-ago Biot who made the first radio. The truth is that the road turns slowly, as all proper highways should. No one can say just what point is the turning one; just which workman left the bones of his particular labor underneath the center of the bend.

It is quite possible, therefore, that the great scientific discoveries of the immediate future have already happened; that some fact not recognized as vital will turn out to mark the beginning of an important reconstruction. One recent scientific infant has the eyes of the king-finders already on him. This is the recent discovery by two scientists of the Bell Telephone Laboratories, Dr. C. Davisson and Dr. L. H. Germer, that the tiny, invisible electrons, believed to be fundamental units both of matter and of electricity, are apparently some special kind of ether wave, not unlike the waves of light. Many scientific philosophers have suspected that matter and energy will turn out to be the same. The evidence grows.

There is small doubt that the most important problem of all science at the moment is this one of the relation between matter and energy. We believe that we know something about the structure of the atoms of matter. It is suspected that

atoms can disappear into nothingness, yielding energy as they vanish. There is a good chance that some one will settle this matter one way or the other soon. Quite possibly that some one will be an astronomer, for atomic power is the only adequate source that any one has been able to think of for the enormous energy of the stars. Somehow, the fires of Vega and Sirius, even of our own sun, are kept alight by consuming the very substance of these celestial spheres.

Next to the problem of matter and energy, the great puzzle of science is probably that of heredity. Creatures as large as elephants grow up out of tiny germ-cells scarcely larger than a pin point. Patient microscopists have seen inside these germ cells still tinier darker-colored granules which go through some astonishing antics each time that a single living cell divides into two; which division is the fundamental process of all living growth, from elephants to germs. We seem to be hanging on the very verge of discovering something about how these tiny granules transmit the proper sets of such characters as trunks and tails and brains to all created things. Some one may push us off the edge into knowledge almost any day.

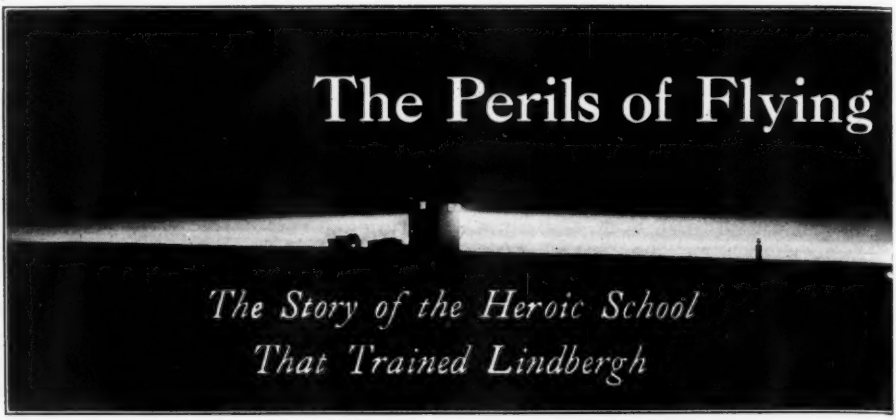
In medical science the pressing problem is that of immunity. Why does one attack of measles protect you against another attack? Why do some people "take" diseases easily, others with much resistance? Why do vaccines and sera usually protect against infection? Many probabilities are known; certainties on some points are possible during the year. Of the two diseases which now seem the most serious—cancer and heart disease—no "cures" seem probable in the next twelve months. Progress will be made; it is being made continually. But the road ahead seems long.

In chemistry it is reasonably certain that we already hold the key to progress. This is catalysis, that once-mysterious process by which some material like powdered iron assists a chemical reaction in which it seems to take no part. Coal gases, for example, may be passed over the proper kind of powdered iron and will yield something very like gasoline. The clue to this astonishing fact lies in a special condition of some of the surface atoms on the iron. Important developments in this field, both practical and theoretical, are virtually certain within the year.

A development which lovers of the picturesque may not welcome so enthusiastically is evident in geology. This is the passing of the prospector. Methods of mine-finding by electricity, by sound waves, by measuring the intensity of gravity, by radio, by earthquake waves from great blasts of explosives—all are now under trial by competent experts. It will be surprising if important practical methods for locating minerals like coal and oil are not forthcoming soon. The plentifully bewhiskered prospector and his faithful burro will give place to parties of automobile-borne engineers profusely accompanied by scientific apparatus.

In the realm of weather science, often so utterly despaired of, some one is likely at last to remove Mark Twain's famous reproach and do something as well as talking about it. The greatest practical problem of weather science is the long-range forecast: some way of learning, a month or a season ahead, what the country's weather is likely to be. While this may not eventuate within the narrow limits of a year, it is clearly on the way. The apparent path to it is through the study of solar variations and of ocean currents, studies already used for forecasting, with imperfect but encouraging success, by the unofficial meteorologists, H. H. Clayton and Herbert Janvrin Browne.

In the science of communication no further startling discovery is probable. Most of the needed discoveries have already been made. The art of flinging speech through space, as exemplified by the telephone and radio, is already far ahead of the arts of getting power, of healing the human body, or of making useful things by chemical catalysis. Telephone service between the continents is now a commercial service and television is in good way to join it as man's newest annihilator of space.



The Perils of Flying

The Story of the Heroic School That Trained Lindbergh

The snow was several feet deep and drifting rapidly. As night came on the blizzard gained in fury. All trains were stalled. Power plants were put out of commission when ice and sleet broke the wires. Only the air mail planes came through.

In winter the newspapers often carry paragraphs like that. A lone plane hurtling through space at nearly two miles a minute, ice-sheathed or slippery wet with fog, its pilot half-frozen and blinded by snow or mist, fighting with every ounce of energy to keep his ship on a true course a mile or more above the earth which he cannot see—such is the service that trained Charles A. Lindbergh and that has made our air mail pilots the best in the world.

Lindbergh was a pilot on the St. Louis-Chicago contract air mail route, dreaming and planning of his New York to Paris flight, but making a living by flying while he studied the vagaries of the air, the tricks of the weather, and the countless problems of putting a plane through any pace demanded of it.

One afternoon last November he reported at Lambert Field, about seven miles out of St. Louis, as usual, to take the 4:15 plane over the 278 miles of mid-west flat lands, by way of Springfield and Peoria into Chicago. His machine had been pulled out of the hangar, an old army DH, remodelled, and possessing some fifty alterations brought about by the varied experiences of the mail pilots during the eight years that they had been flying this cast-off war equipment. He was due in Chicago at 7:30 that evening, touching Maywood Field, where the New York and Cleveland pouches would be placed aboard the eastbound night plane, thus carrying the St. Louis letters and light parcels into New York in time for delivery early the following morning.

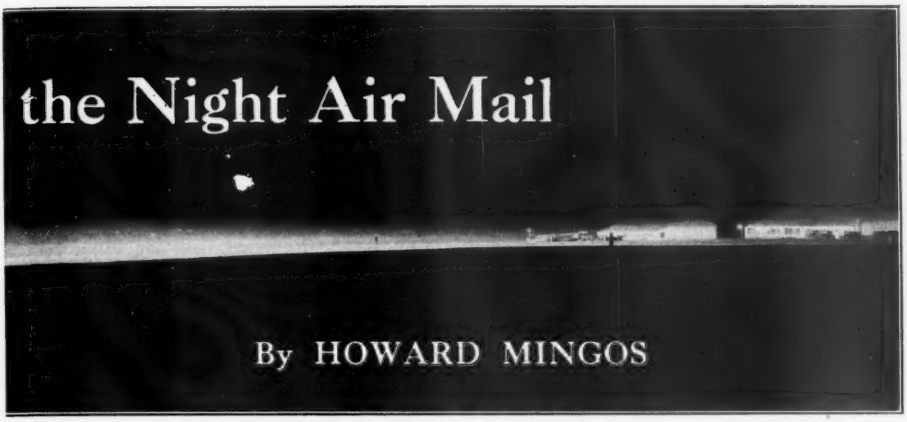
He had very little to do with his machine. At the end of the last flight he had turned in his log book and machine report card on which he had noted whatever repairs were to be made. Inspection crews had gone over the plane and engine while he slept. Oil had been drained and the crank case and tank refilled with new. Gasoline and water supplies were replenished. A rigger had examined every fitting, testing wires, braces and landing gear, the controls and fabric covering. Another inspector had checked up all repairs.

As Lindbergh slipped into his flying clothes he was handed a sheaf of weather bulletins received by telephone from the weather bureau in St. Louis, last minute reports from every section of his route. He might know what to expect.

"Weather's rather thick over parts of Illinois," commented the manager of Contract Air Mail No. 2, his company.

"Guess I can fly under it all right," said Lindbergh.

He drew his lanky frame up and over the side of the machine, displacing the mechanic who had been sitting there idling



the Night Air Mail

By HOWARD MINGOS

the engine, keeping it warm. Feeling about him to make sure that his parachute was firmly strapped about his body, the bulk of it making a nice, soft cushion for him to sit upon, he pushed up the throttle, jazzed the engine, shook the control stick, looked right and left, back and in front, to make sure that all parts of the machine responded properly; then looked up at the sky where only a few clouds were drifting lazily overhead. The mail truck, which had brought out the several pouches to be stored away in the front compartment, turned back to the hangars, and Lindbergh taxied across the field, swung round into the wind and "gave her the gun." It was just another routine flight. He headed on a bee-line for Chicago.

Everything humanly possible on the surface had been accomplished toward making this flight, like all the others, completely safe. Now it was up to the pilot. Nobody else could help him. In view of the advance weather reports, he flew lower than usual, to get under the thick of it, hoping that he would not have to climb or detour farther on. He could still make out his landmarks, but dense clouds above him hid the evening sun. Far ahead the mist was heavier, a grayish tinge that blocked off the horizon. He climbed still higher, to the ceiling, pressing forward under the clouds, almost near enough to reach out and tear off chunks of the misty stuff with his hands.

He reached Springfield in an hour, without incident, though the clouds were hanging low and thick. Still, he could get up 500 feet over the surface; and this ceiling, he felt, would hold out long enough for him to reach Chicago. So he took aboard the pouches at that point and was off again in five minutes. About twenty-five miles out he found himself in darkness. A light snow commenced falling and the air became intensely cold.

In the mist Lindbergh could not pick up the surface lights. The clouds dropped lower, melted into the mist. He was now in total darkness, save for the tiny lights on the instrument board in front of him, past which dense, smoke-like ribbons of fog and mist were swirling, kicked back and swept into the cockpit by the blast from the propeller. It churned the heavy air with a monotonous droning, but it was sweet music to his ears: it meant that he could keep on going right through the welter, as long as his fuel lasted.

But here was the danger: there was no way for him to be sure of his course. His compass was an ordinary affair, not the new and almost perfect earth inductor compass which he planned to use on his Paris hop. The magnetic compass was not reliable, especially in a side wind. Now, while the wind was not strong, it struck his ship sidewise, and he knew that it was drifting him off his course. He tried to check it, ease back, and compensate for the driftage. But he could not tell exactly.

Much time was lost. It was like stagger-

ing through the dark. The minutes passed, grew into hours. He realized that his fuel would soon become exhausted. He pulled a lever and released a parachute flare; but instead of descending slowly it dropped like a stone. He could not see where to land. Then he nosed up through the clouds to 14,000 feet—nearly three miles high—but the clouds were higher than that. He could not get over them. At 7:51 by his watch the main fuel tank went dry. He knew then that he had less than twenty minutes more in the air, for his reserve tank would last only that long.

He was now 13,000 feet up and traveling at seventy miles an hour, blindly. Here he prepared to jump. He cut his switches and put one leg over the right side of the cockpit, then he noticed that the right wing was tipping downward. This meant that his ship would probably spiral down into his chute if he left it in that position, so he climbed back in again, righted the ship, got her on an even keel, and hastily leaped out over the left side. He tumbled head first for several seconds.

Sure then that he had cleared the tail of the plane, he pulled the ring of his parachute. A strong spring, thus released, sent a very small chute flying out and open. This in turn dragged out the big chute its full length—then it too snapped open and Lindbergh was swinging dizzily in the clouds.

He dropped swiftly, down through nearly 13,000 feet of clouds and, as he felt the fog, prepared to land as blindly as he had jumped. By manipulating the shroud-lines, he could prevent swaying, and this would save him from being dashed against a building or pole.

Even under the best conditions, such a jump is not pleasant. From his pocket he pulled a flashlight, with which he tried to see the earth, but in vain. Almost before he knew it he landed across a barbed wire fence, but his thick flying suit prevented injury. Gathering up his chute and wrapping it into a tight bundle, he carried it out to the road, and into the town of Covell, Illinois. Next morning he found the wreck of his plane not far from where he himself had landed.

But, after all, this was only one of the innumerable adventures of the mail service. People commenced talking about it only after he had made his historic flight to Paris. Somebody had nicknamed him "Lucky Slim." Perhaps they were thinking of another pilot, a probationer in the Federal service flying the night route from Omaha to Chicago. He had encountered snow and lost his way. Deciding to come down, he released a flare which lighted up a cornfield in Iowa. Then he jumped. But he pulled the rip cord of his chute too quickly. It snapped open before he cleared the plane and caught in the tail surfaces. There it was torn to shreds, and the pilot dropped like a stone. When he failed to arrive at the control stop in Iowa City, others went out to search for him, as they always do. They flew about on all sides of the route until daybreak, when they found his wrecked machine; the torn chute and body some distance away told the story of the accident.

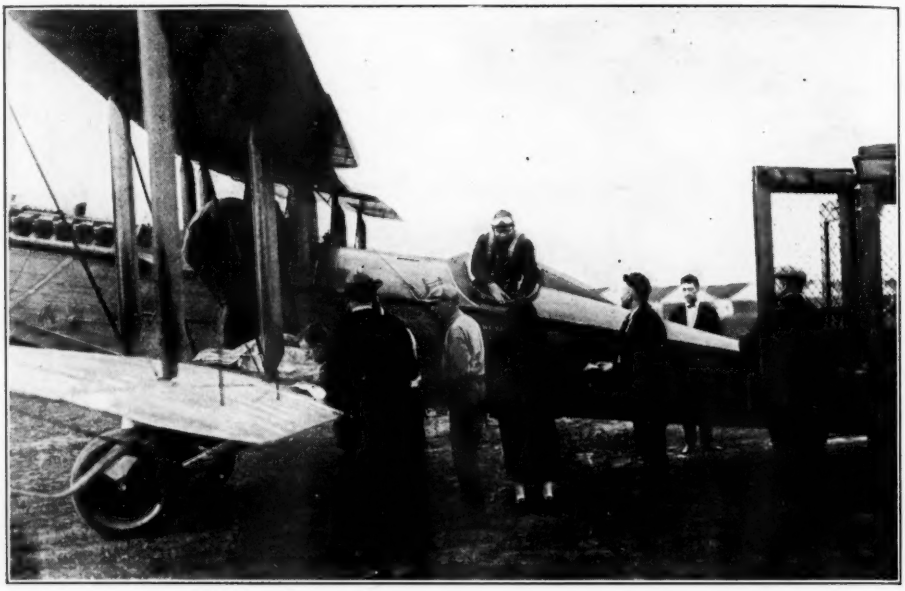
Veterans assert that a trained aviator requires at least two full years in the mail service before he can be depended upon to do the right thing in an emergency. In that period, they say, he will have many accidents, and on the average will wreck two or three planes, with excellent chances of being killed. In the last nine years, since the first air mail route was established, about forty pilots have been killed, though not more than that number have been employed at any one time. The majority of them had been flying the mails less than two years.

Mail planes are now flying between New York and Chicago both day and night; and between Chicago and Salt Lake City, between Salt Lake and Los Angeles, and between Salt Lake and San Francisco. Other branch routes extend to distant cities, linking up San Francisco, Portland, Seattle, and Vancouver, British Columbia; Chicago with Kansas City and Dallas, Texas; New York with Boston and Cleveland; and Chicago with Detroit. Other routes are being opened this summer. In winter even the daylight routes demand much flying after dark.

Fog is the worst handicap. It hides every-

THE TYPICAL AIR MAIL PILOT

This unusual drawing of Colonel Charles A. Lindbergh by Oscar Cesare discloses how completely the flying helmet may change the appearance of a flyer—but here we have the real Lindbergh as he appears as an air mail pilot who exemplifies the well-known quotation from Herodotus which appears on the façade of the New York Post Office: "Neither snow, nor rain, nor heat, nor gloom of night stays these couriers from the swift completion of their appointed rounds."



AT THE NEW YORK AIR MAIL TERMINAL

Pilot Wesley Smith is shown transferring mail to a Post Office truck which must travel many miles to the main station. The efficiency of the air mail will be increased by more centrally located airports.

thing. In the air fog is as thick as soup. One morning a veteran hovered over the mail field at Bellefonte, Pennsylvania, for an hour and a half. It was a dismal situation. The gauges registered only a few gallons of gasoline and he could only guess that he was somewhere near the field. He could see nothing below. Now and then a tree-fringed hilltop would appear, sticking above the sea of mist like an island and indicating the limits of the valley which he thought must hold his airport. By mere luck he managed to find a hole in the fog, got a fleeting glimpse of the field, and glided into it, with his fuel tanks utterly drained.

The mountain route at night is the most dangerous of all. Pilots flying the Alleghanies between New York and Cleveland rarely see the gigantic aërial beacons and intermediate lights between Youngstown, Ohio, and Easton, Pennsylvania. They are hidden by the mist. The pilots learn to fly by dead reckoning, high up and over the top, wherever possible.

Wesley L. Smith is one of the old-timers in the service. He has been flying the mails ever since the first route was established, in 1918. He admits that he has been exceptionally lucky. The majority of pilots who entered the service the year that he started have "gone west," cracked up in their planes, though in the early days they did not wear parachutes and were unable to jump and save themselves if anything went wrong.

Smith had flown the Cleveland-New York division so often that he knew every landmark. Twice a week and often three or four times in a similar period, he had made round-trip flights. Then one day he came eastward and headed into black fog. He could not see the earth, but continued on, flying a compass course, quite sure that the air would clear before he reached New York. After an hour and a half of blind flying he concluded that he must be somewhere near the seaboard. He zoomed low in an effort to get his bearings. His altimeter recorded that he was almost on the surface, but still he could see nothing.

The minutes passed and he came down much lower. This time he got a glimpse of it through a break in the fog. Instead of

WHEN LINDBERGH ESCAPED BY PARACHUTE

About 13,000 feet in the air at night, lost in the fog and out of fuel, Charles A. Lindbergh jumped. This is the wreck of his plane found the next morning near Covell, Illinois.

land, it was water he saw, and judging by the waves he was far off the coast. Lacking a horizon or any other landmark he had no means of checking up on the direction, so he cruised about in circles. He had about decided that his gas would become exhausted before he got anywhere when he found another hole in the fog, and through it there loomed up a lightship. He recognized it, and knew just how to steer in reaching a flying field on Long Island. There he landed without further trouble. Had he not seen the lightship, his disappearance might have remained a mystery.

Some of the pilots lost their lives by fire. In the early days experimental mail planes or inadequate and ancient war equipment were responsible. The machines would either catch fire in the air or burn up as soon as they struck the ground. Conditions are much better to-day; but one must always be prepared for freak accidents.

Crossing Great Salt Lake one afternoon a pilot noticed his engine thermometer registering above the danger point. As he watched, the mercury rose to the limit and the radiator cap blew off. He throttled down for a glide across the lake, saw that he could not make it that way, and not wanting to land in the water with his load of mail, again throttled wide open. The engine burst into flame. He continued to glide, sticking to his post, and managed to reach shore, jump out of the machine, and fight the fire with his chemical pump until he thought it was extinguished. After pulling some fifteen pouches out of the compartment, he fainted from overexertion.

Regaining consciousness, he saw the flames spreading back under the plane and endangering the pouches which lay near-by. Again he carried them several feet away. Then he made a futile attempt to put out the fire. As he was turning away from it he saw that the wind was blowing the flames through the dry greasewood directly toward the mail. Running back and forth through the fire he carried the pouches to the other side and sat down to rest. At that moment the gasoline tank burst and the blazing fluid jetted out in a graceful curve to fall directly on the pile

THIS PILOT WENT DOWN WITH HIS SHIP

Charles Ames disappeared at night over the Pennsylvania mountains. His body was found ten days later in the wrecked machine which had crashed into a dense growth of white oaks, four miles from his refueling station at Bellefonte.

office of the president and remarked that he did not believe they should trust the air mail further.

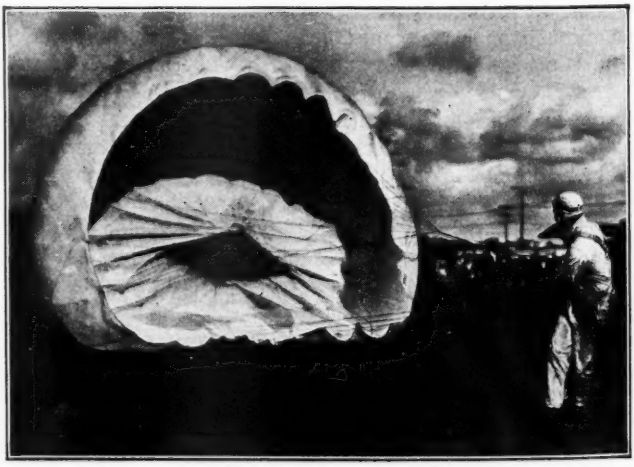
"Why not?" asked the president. He had been a banker in the stage-coach period. He had lost money in hold-ups and later in train wrecks.

"We have been sending mail by air for some time," he said. "This is the only loss. Let us forget it." He then ordered all items of more than $400 shipped by air mail.

The pilots know that upon the regularity with which their service is maintained depends the patronage of the public. They know that there is danger in bucking storms, in flying the mountain ranges at night when bad weather prevents seeing the emergency fields which lie at regular intervals, lighted by caretakers and ready to receive a plane in distress. Only those pilots who have operated machines over the routes in daylight become night mail carriers. Some of them fly for months,

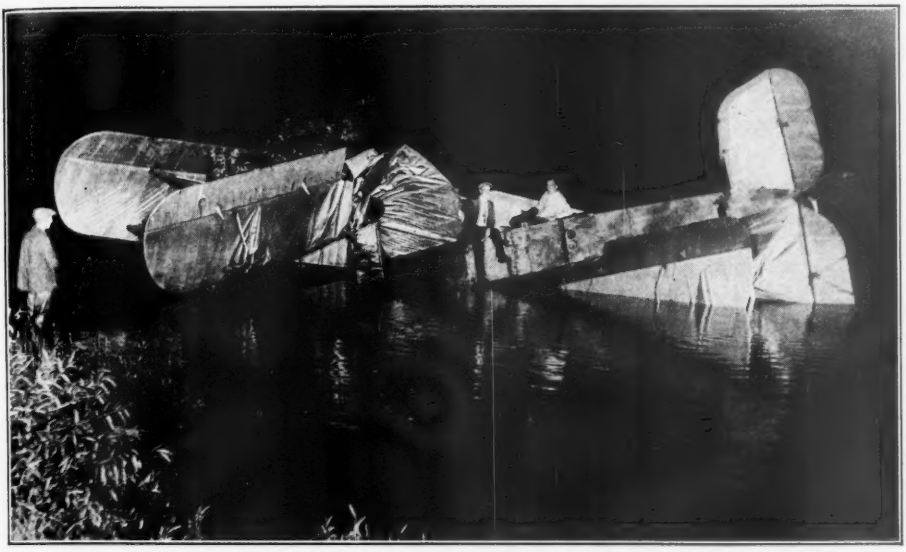
of pouches. That time he could not save them. It was the only mail destroyed in a twelve months period; and resulted in having all radiators on the mail planes replaced by those of another type.

The pouches contained considerable banking paper from San Francisco institutions. In order to insure clearance and proper credit after the loss the banks were put to much bother and expense. In one instance the cashier entered the



AT THE END OF A PARACHUTE JUMP

The pilot who has reached the earth safely often experiences great difficulty in preventing his parachute from dragging him along the ground.



A NIGHT CRASH INTO A RIVER

When Harry Chandler lost his bearings in a dense fog at night he was forced to land blindly, striking the Susquehanna River near Bloomsburg, Pennsylvania, and receiving a fractured skull.

even years without accident; many of them average 50,000 miles of flying every twelve months. And then, after a long period of perfect success, one of them will disappear.

Charles H. Ames flew out of the New York terminal at New Brunswick, New Jersey, in the evening, taking the usual load westward over the mountains of Pennsylvania, his first stop Bellefonte, Pennsylvania. Below him he had an emergency landing field every sixteen miles, with lighted markers so located that he always had three of them in sight, when he could see anything at all. He also had a great aërial beacon at Bellefonte, capable of sending its rays for a hundred miles pitched one degree above the horizon. On clear nights a pilot could see it fifty miles away.

Ames never reached Bellefonte. The land crew awaited his arrival throughout the night. Telephone calls to the emergency fields developed information that he had been heard passing over some of them in very thick weather, with dense fog hanging closely to the surface, especially in the valleys. Search parties scoured the wood; and ten days later a boy hunting about four miles east of Bellefonte found Ames. The torn and splintered wreck of the mail plane lay in the undergrowth with the body of the pilot still strapped in his seat. Parts of the machine were caught in the trees, and broken branches showed just how it had crashed through them, probably before Ames realized that he was so near the earth. He evidently had no time to jump.

They dislike the idea of jumping over the mountains: they believe that they might be dropped into the top of a tree or the parachute so caught that they would be rendered helpless, and there, unable to get down, await a lingering death. The majority prefer to stick to their planes over rough country.

Paul Scott was flying westward out of Salt Lake City. He met with both fog and snow, and his path became dark as night. He finally turned aside, southward, to circle a mountain range and there saw a small hole between the fog bank and the clouds, directly over Saddle Pass on the main route. At a mile and a half above the surface he dove through it, but not quite through. The hole closed up in front like a blind alley. He banked his plane and turned about.

THE MOST TRAGIC FINISH OF ALL

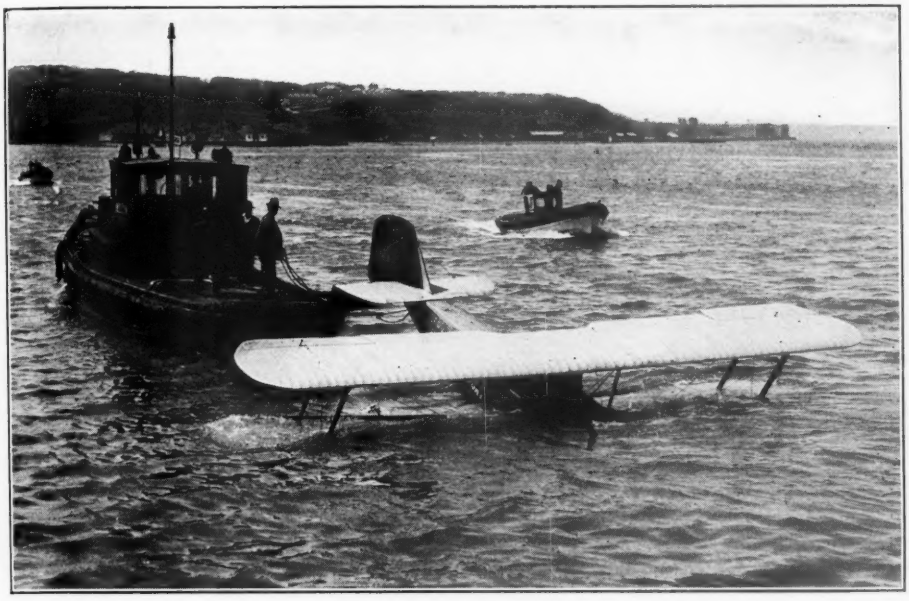
When Art Smith's mail plane failed to arrive at its destination other pilots out on the search found the charred skeleton of his plane near Bryan, Ohio. Smith had died in the crash.

He could not see twenty feet in any direction. The plane pitched up and down like a bucking broncho. He started to climb, but at that instant felt a slight jolting, then another. His wheels were swishing through the tops of cedar trees. When he came to his senses he was buried in snow. His right hand fumbled for the switches, mechanically trying to turn off the current and prevent an explosion. His left shoulder was dislocated. His arm hung numb and useless. Struggling down the mountainside to keep from freezing, he slipped on the shale rock and rolled for yards. The fall snapped his shoulder back into place again. He got up and struggled on. Hours later he reached a railroad and managed to flag a train. Mechanics who climbed up to the wreck found it had cut a path forty feet wide along the ridge, at one place clipping off a tree sixteen inches thick. But the mail was saved. In spite of the difficulties the mail goes through about 97 per cent. of the time on all of the 9,000 miles or more of cross-country air routes.

Landing a machine in trouble is always difficult. In the mountains it is especially dangerous. On the Nevada side of the Sierras it is a tight squeeze if one is to avoid hitting the crags. Storm clouds closed in on a pilot crossing them late one afternoon. Night came upon him before he knew it. He sat his machine down in Truckee Cañon, barely scratching the wings; but when the salvage crew came up they had to take it apart to remove it from the gulch. On another occasion a pilot flopped into the Rockies and they had to take his machine apart and pack it out of the mountains with mules.

Snow is almost as bad as fog. It is not unusual for sleet to weight a plane down and change the shape of the wings so that it cannot remain in the air. The pilot comes down, kicks off the ice, and goes up again. Very often his flight becomes a series of hops across country. Lindbergh had excellent training for his transocean flight, for he had encountered all kinds of weather on his air mail route.

Weather is tricky, particularly in the Rockies. Jim Murray was heading toward Cheyenne one October afternoon. He found the Medicine Bow Range enveloped



A LAND PLANE IN THE WATER

When Milo Campbell's engine stopped 1,500 feet up he glided down to a watery plunge into San Francisco Bay. Campbell wearing his helmet is on the rescuing tug.

in clouds. Toward Elk Mountain on the south he saw a gap where the storm apparently had split apart. He reached it as it closed again. All he could see was a blanket of tree-tops underneath and a thick white wall ahead. He commenced climbing until he felt the controls sag. The plane was stalling. The trees rose up to meet him.

Those who have flown in all kinds of weather are probably the most skilled and the least fearful when they are forced down. They say that landing in the mountains is not so bad, but that it requires skill and presence of mind. Their method is to cut the ignition, drain the gas tank, remain up as long as possible to cool the engine and thus prevent fire; then land uphill. Murray put his machine down in that fashion, uninjured. He climbed out and walked through the night in three feet of snow; and when he became exhausted, sat down under a tree and went to sleep. His fur-lined flying suit prevented freezing. Next morning he discovered a cabin standing within a hundred feet of the spot where he had camped out. He did not inger, however, but kept on going—for twenty-four hours. He staggered into Arlington, Wyoming, and though his clothes and shoes were worn to tatters, the first thing he did was to telegraph the Post Office Department requesting a pair of snowshoes. He got them, too; and after that carried them strapped to his machine.

Flying out of San Francisco on a winter afternoon, Claire Vance nosed up until his altimeter recorded 11,500 feet above sea level. He was crossing the Sierras. Inside of thirty minutes he had plunged into a snowstorm without much warning. He continued on, and twilight was fading into night when Vance realized that he had become lost in the air, unable to see where he was going and knowing that lack of fuel would soon force him to earth. He had to come down, and he managed to land in a light timber patch. He built a fire between two huge logs, laid down, and slept fairly comfortably all night.

The next day he walked for hours, down the mountain slopes, until he stumbled upon the little town of Last Chance, famous in the gold rush days. There he procured a pack mule team and went back

A VICTIM OF FOG

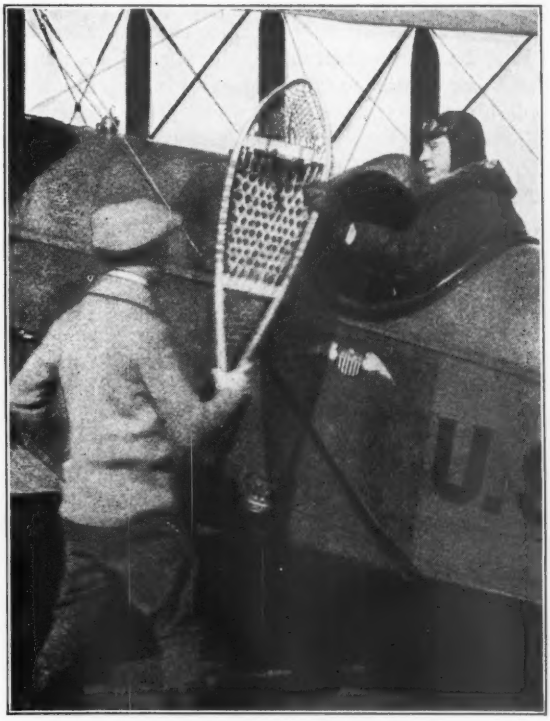
Caught in one of the worst fogs of the season, Edward Neher, mail pilot, and Albert Schaller, official of his company, crashed at night in a lonely slough near Gustine, California. Their bodies were in the wreck when it was found after a search lasting for days.

to the wreck, got the mail and pushed on to the railroad. As there was no telephone in Last Chance, days elapsed before he reported to the outside world, though brother pilots had searched the mountains and given him up for lost. Vance heard the planes buzzing through the valleys and along the ridges, but had no means of signalling them.

Civilian operators have been trying to procure trained pilots for a wage of $3,600 a year, which indicates that attempts will be made to cut the pay of pilots generally. The mail pilots say, however, that it will be unwise to employ untrained aviators on the regular routes, and that they are worth every cent of what the pilots received from the Post Office Department when it operated the transcontinental route between New York and San Francisco. They then averaged between $5,000 and $8,500 a year. They explain that they do more cross-country flying than any other group, and that half of their flying is done at night, much of it in bad weather. Over the mountains and occasionally during a storm in the Middle West, particularly along the Great Lakes, the winds are so strong that they sometimes hold a plane aloft, swaying first over one spot then over another, while the pilot works to the point of exhaustion in a brave effort to prevent being turned upside down.

Bob Ellis left Rock Springs on the usual four hours' hop into Salt Lake City. As he approached a mountain wall rising 9,000 feet, he nosed up to hurdle it, as he always had done, and was shocked to find a mighty stream of cold air flowing over it like a Niagara Falls. It caught the plane and pushed it earthward. Ellis cut his switches an instant before he struck the face of the mountain. Badly damaged, its nose shattered and wings broken, the plane began sliding backward until it halted on the very edge of a precipice. Gingerly Ellis eased himself out of the machine, climbed up, and up. He worked his way through the snow to the top of the ridge, then down a slope, waded knee-deep for hours, and finally procured help. He led all hands back to the upper edge of the snow line. They formed a human chain for a hundred feet down to the wreck. One by one the mail pouches were passed up over the ledge.

Another pilot, lost in those mountains, found the snow so deep that he could not get through it. He had no snowshoes, but he had an overcoat and a traveling bag, used when he had to put up overnight at the end of his run. With the coat in one hand and the bag in the other he was able to stay on top of the thin crust. But he could only crawl. He crawled, for two days and nights, through ravines and over treacherous barriers. On the second evening he lay down, wondering how long he would require to fall asleep permanently. One last glance about him. What was that? A light? Absurd! There couldn't possibly be a light so near. But it *was* a light, glimmering through the window of a forest ranger's cabin. There he was put to bed, remaining for days, until he was able to sit on a horse and ride into town.



MURRAY RECEIVES HIS SNOWSHOES

After a forced landing in the mountains and a narrow escape from winter drifts, this pilot carried snowshoes on his plane so that in case of another crash he could find help more quickly.

In his statements Lindbergh has constantly reiterated his belief that people have not given the air mail pilots enough credit. He has pointed out that each individual is a hero, and those familiar with that brotherhood agree, whole-heartedly.

Forced down on the Nevada desert near Secret Pass, a pilot set out walking toward the nearest settlement. After several miles he found a horse grazing. It permitted him to mount, and then promptly threw him off, breaking his ankle. He hobbled for hours until he reached a ranch house where he telephoned for help. A reserve plane was flown to the ranch. He got in it and flew back to his own ship, left the others there to make repairs, got in the plane, after transferring to it all the mail, and flew on into Elko, Nevada. There his ankle was set in a plaster cast. Next day he again went out on his regular run.

The man who got his letter by way of that flight probably cursed broadly because of the ten or twelve hours' delay; but it is more than likely that he received it more quickly than if it had traveled by train. Once in a while the delays are longer.

Johnny Eaton had engine trouble on the Nevada desert, about seventy miles from the nearest habitation. He remained with his plane, knowing that he would probably die of thirst if he left it; and there he drank sparingly of the water in the radiator. He knew his comrades would be out looking for him, and they were. But when, three days later, they dropped down alongside, they found him doubled up in agony. He had contracted metal poisoning from the radiator water. After that, army canteens were issued—just another development from the school of harsh experience.

A sand storm is about the most deadly thing that a pilot can run against in the air. There have been times when machines flying in opposite directions have missed one another by inches, simply because the pilots were blinded, not being able to see

past the noses of their planes, and with every turn of the propeller sweeping clouds of sand back into their faces, the sticky, humid air smearing their goggles and rendering them useless. The wind often whips into a terrific blast on the plains.

One night the Cheyenne mail plane flying eastward ran squarely into a wind storm which the pilot had hoped to escape. But when some of the beacon lights failed to appear, he decided to land at Chappell, Nebraska, where he saw the field lights shining brightly and all clear. He throttled his engine and glided down to within five hundred feet of the surface when a blast struck the machine, turned it over and over, knocked the pilot senseless against the instrument board, and then politely landed on the air mail field, crashed, tipped up on its nose, threw the unconscious aviator out and clear, then continued on its erratic course, blown like a leaf by the wind hundreds of yards away. A few minutes later the pilot and caretaker of that field removed the mail. After the storm another ship came in and sped it on its way into Omaha. Later, it was learned that a Union Pacific passenger train had been slowed down to five miles an hour, because the engineer feared the wind would blow the train off the tracks.

If there is one kind of weather worse than another, it is a thunderstorm. The pilots are afraid of lightning, though they have to fly through it often. J. D. Hill had the most terrifying experience. Flying eastward from Bellefonte, Pennsylvania, toward New York, Hill had put his machine up over the mountain ridges which stand like hurdles, four or five of them along that night route. He felt a blast of chill air as it struck sidewise against his plane. His propeller blades commenced biting into masses of wet black clouds, and a streak of lightning leaped at him without warning. He tried to climb above it, for it would have been foolhardy to risk a landing on such a night—better to keep on.

Before he had climbed more than a few hundred feet he was in the heart of the storm, such was the speed at which he had entered it. He had all he could do to keep his plane from being rocked into a bad stall or sent nose-first out of control. Still he climbed, with lightning splashing about the machine on all sides, until it seemed to be part of the storm, a roaring thunder god crashing through space, with a long tail of sparks from its open exhaust and crowned with a halo of lightning. But Hill kept on. There came another and particularly vicious crash, and then another, close at hand this time, followed almost instantly by a burst that seemed to stop his ship in mid-air, rendering him blind for the moment because of its brilliant flash. Hill felt himself tumbling, knocked out of the sky. It was only for an instant. He realized what had occurred. The engine had been struck by a lightning bolt: but it had picked up again. The propeller twirled merrily, so Hill continued on.

When he landed at Hadley Field, New Brunswick, he told of his experience, but the mechanics could find no evidence that lightning had struck ship or engine. They took Hill's word for it, however. They were also inclined to believe that he had flown through the worst electrical storm of the season, when next day they learned that a passenger train had been derailed by a washout almost underneath that part of his air route where Hill had been struck. And all others familiar with aviation admit readily that for sheer heroic flying these pilots of the night mail, and the day mail too, as a matter of fact, are entitled to the first prize. Their daily work is producing our Lindberghs, and when flying becomes safe for the average person we shall look back and credit these pioneers with having forced the improvement of commercial planes, gradually, through their experiences with indifferent equipment.

The Story of the Sea Devil, Germany's Boldest War-Time Buccaneer

Beating the British Blockade

How the Raiding Sea Eagle Fooled the Allied Cruisers

LOWELL THOMAS

Any German raider that could break through the British war blockade had to be full of tricks and in the most matter-of-fact way had to appear to be what she was not. Count Felix von Luckner's mysterious raider, the Seeadler, *outwardly appeared to be a Norwegian lumber carrier, and for weeks her crew were rehearsed in their rôles as Norwegian sailors. In their first encounter with the British the Germans nearly lost because Count Luckner swallowed his quid of tobacco and because of a series of accidents—as told in this installment. Mr. Thomas writes the story as it was narrated to him in the first person by Count Luckner.*

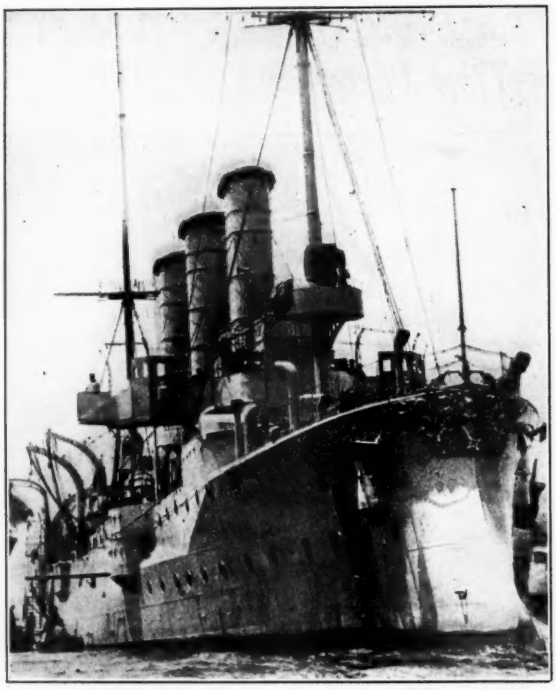
SAILS BELLIED and motor humming, we parted the waves and left a path of foam in our wake. On deck we devoted all our spare time to more dress rehearsals. My boys took a particular relish in putting me through the "third degree," as you call it. One of them played the part of a British search officer.

"Now, Captain, what is the name of your ship?" he bellowed.

"She is the *Irma*, and as good a full-rigged ship as ever crossed the North Sea."

"Have you any brothers and sisters, Captain?"

"Oh, yes, a lot of them. There are Olga, Ingaborg, and Oscar who live in Hatfjelddalen. Dagmar and Christian are seamen like myself. Lars runs a salmon cannery in British Columbia, Gustaf and Tor are lumbermen. And then we have another brother, Eric, whom we've lost track of."



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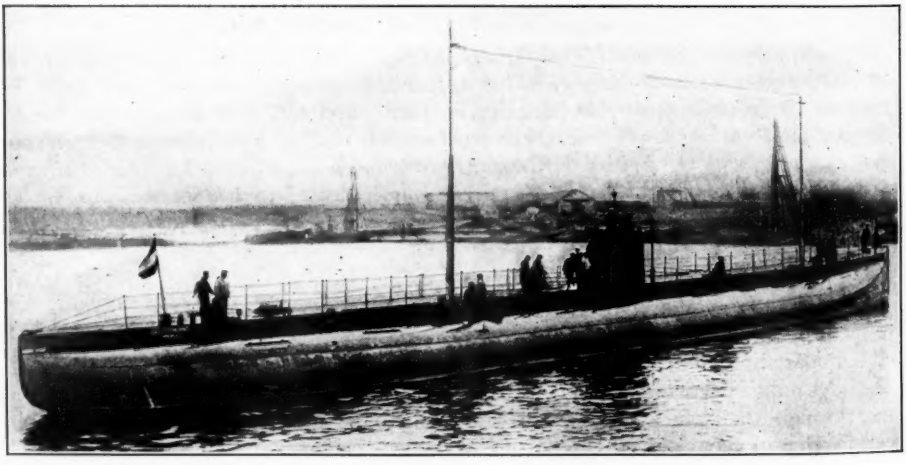
S. M. S. "KÖNIGSBERG," GERMAN CRUISER

War found this warship at sea and in September, 1914, she sank H. M. S. *Pegasus* in Zanzibar Harbor. The next month when pursued she sought shelter up the Rufigi River in German East Africa. In July, 1915, two river monitors, with airplanes spotting their fire, made a total wreck of the cruiser.

While trying to make the narrow channel of Norderaue we hit a sand bank. The ship creaked and the masts trembled, but somehow we pushed across—further proof that the Americans still know how to turn out a sturdy clipper ship. At ten o'clock we passed the Horns reef and continued along the Danish coast. At eight bells we hoped to reach the Skager Rack, and then turn her west to give the enemy the impression that we had come from a Scandinavian port. Shortly before daybreak the wind shifted abruptly from southwest to due north. Against such a stiff breeze we could make little headway. On our right were the low rock fjords and reefs along the coast of Ringkjöbing and Thisted. To the left were British mine fields. We didn't dare run into a Danish harbor for fear of being interned. So we must either turn back or take a chance on slipping through the mine fields. It is always possible to sail through



THE DEUTSCHLAND CLASS CARGO SUBMARINE AT BALTIMORE

Germany planned the *Deutschland* class sea-going submersible cargo carriers to elude the British blockade, and one reached Baltimore with a cargo of valuable dyes. With the entry of the United States into the war these submarines were armed and sent out to attack Allied shipping.

a mine field—provided you sail under a lucky star, with a guardian angel at the helm. With a full spread of sail we turned straight west.

Now, a tacking ship heels over. The more sail you carry the more she lays over, and the less water she draws. That was our chance. The mines were nearly always planted several feet under water, just out of sight. Perhaps we could slide right over them. Lifeboats were lowered and every man adjusted his life-belt. Before the mast the sailors, aft the captain. But we all kept to the foreship. We were lower aft than fore, and if a mine went off it probably would be aft. But our luck held and we got through in safety.

Joseph Lockner

Our course lay around the northern end of Scotland, along the usual shipping route from Norway to the Atlantic. To be sure, we could have hugged the Norwegian coast, but the blockade was even tighter there. That was the natural course for one of our raiding armored cruisers to take, so, if she were headed off by Beatty, she could turn quickly into a neutral Norwegian port and accept internment rather than capture. We didn't keep even to the middle of the North Sea, but with the idea that our one path of safety lay right under John Bull's nose we followed the coast of England and Scotland.

There were three lines of the blockade. The first lay across the North Sea from the Scottish to the Danish coast. We must run this one first.

The wind grew stronger. The barometer fell. Any one on the North Sea on December 23, 1916, will remember the hurricane that came. It was one of the worst storms of years. The wind was cyclonic in force, and lashed the shallow North Sea into a cauldron. Running before it we carried every foot of sail we dared, every stitch except the royals and gallant sails and smaller stay sails. We could take chances. We had no shipowner to answer to. Every mile through the storm now meant a mile through the blockade. The ship lay over so far that all our leeboard was under water. Every plank quivered from the strain on

THE WINDJAMMER'S RIGGING

Luckner spent much of his youth before the mast and learned to handle every rope of a sailing ship. It was this qualification that earned him the command of the most daring buccaneering ship of modern times, the *Seeadler*.

the rigging. The rigging sang like a violin. Heavy waves swept over us. It looked at times as if Niagara Falls were descending upon us. Two men were needed to hold the helm, and had to be lashed there. Some of our stays broke and some of our canvas ripped. But we made fifteen knots an hour, and that hurricane was a godsend to us, for we knew no British cruiser could search us or even keep track of us in such a gale.

We sped right through the first line of the blockade without sighting a ship and as though the whole North Sea were ours. Instead of going up, the barometer continued to fall. Louder roared the storm and more and more mountainous became the waves. We pass the second line of the blockade. Still not a ship in sight.

"At twelve o'clock, boys, we shall know whether we are going to get through or not. At this speed we shall pass through the third and most important line. Half the Grand Fleet is said to guard this third stretch from the Shetlands to Bergen."

Midnight grew near and still that wild, heaven-sent hurricane kept up. We ran before it like a frightened bird, fearing every minute that our sails and masts would go overboard. We lay on the yards and scanned the horizon with our glasses. Half past eleven! We are in the midst of the blockade line. Where are the cruisers and destroyers? All we could hear was the whistling of the wind and the rushing of the water beneath our bows. All we could see was the blackness of the night. Twelve o'clock and still no sign of the enemy. Even our binnacle and compass lights were out, for any ray of light might betray us. By one o'clock we knew we had passed the last line.

The British, warned by the falling barometer, had taken their guard ships to shelter in the lee of the islands. There was nothing else for them to do in such a storm. Even if they saw a ship it would be hopeless trying to board her. And if Beatty's fleet had kept to sea there would have been grave danger of their running each other down. We couldn't help recalling the old saying that it is indeed an ill wind that blows no one any good.

I thought now that under cover of darkness and with the aid of the storm we might shorten our voyage to the Atlantic by cutting through the channel between the Orkney Islands and the Shetlands. I was about to order the helm changed, when the hurricane shifted abruptly from southwest to southeast. The change came so suddenly that the twisting winds nearly ripped our masts out by the roots. Somehow, that seemed to be a warning to us, a warning not to go through that channel.

A sailor believes in signs. And something told me to take a more northerly course, nearer the Arctic circle and the Faroes. Later we learned that the German submarine *Bremen* had tried to pass through that channel and was never seen again. The channel had recently been mined. But

DISGUISED
Apparently a sailing ship bound for Australia and manned by a Norwegian crew; in reality the *Seeadler*, piled high with lumber which, covering her hatches, concealed an arsenal and crew of fighting strength in her hold.

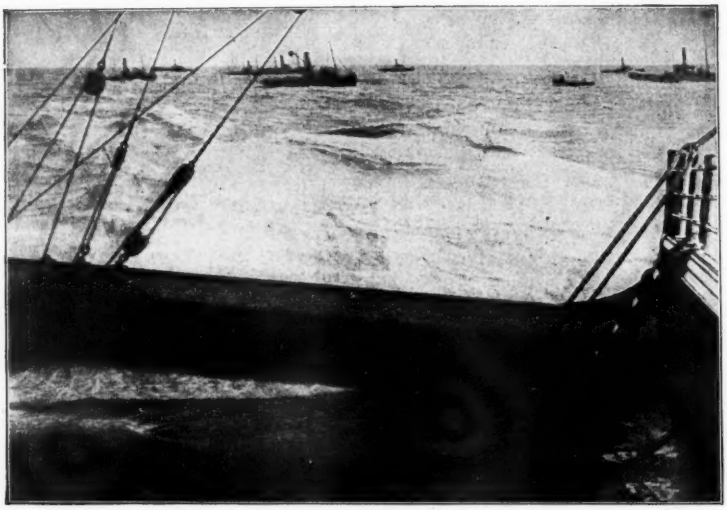
for that sudden shift of the storm we too would have shared the fate of the *Bremen*. With sails still full spread we continued north, nearer and nearer the Polar zone. It grew bitterly cold. The waves dashed over us and the water froze where it fell. Our timber cargo was so coated with ice that not a stick of lumber could be seen. The deck was like a skating rink and the ship's bow one huge cake of ice. Everything froze, including the sails. The ropes became coated and would no longer run through the blocks. We tried to thaw them with an oxygen flame, but they froze again the moment the flame was removed.

Unable to change the sails, we were helpless. To turn on the motor would only make matters worse, because that would carry us toward the Pole all the faster. We knew that, unless the Hand of God intervened, within a few days we should be hopelessly caught in the Polar pack and probably never heard of again. So long as the wind blew from the south we were sure to continue on north. We were in the region of eternal night now, except for a few minutes each day. The sun rose at eleven and set at half past eleven. If we continued this crazy, frozen voyage to the North Pole we should be smashed in the ice, by Joe.

Christmas Eve came, and we prayed God to send us the one Christmas present, the only one that could save us—a north wind to blow us south. My men in the hold, my fighting crew, huddled together to keep from freezing. They were prisoners, for the waves and spray had swept over everything until our secret hatches were frozen as solid as concrete. My false Norsemen on deck slid about on the icy planks, and every man suffered from frost bite. No one tried to turn in to sleep. The tension on our nerves was too great. Only one thing was warm and steaming, the kettle of grog. You landsmen have no idea of what grog means to a sailor under such conditions. No wonder seamen call a glass of schnapps "an ice breaker"!

At heart every sailor is a child and he has a child's love of Christmas. And how he enjoys a Christmas present! He turns it round in his hands, and says: "By Joe, it's good to have Christmas." And surely the present that came to us was the finest that any sailor ever had.

As suddenly as it had come the south wind died down and a breeze sprang up in the north. Our frozen ship creaked, laid over, and came around with the new wind, and our hearts sang for joy. Each day we seemed to thaw out a bit more. Soon we passed to the east of Iceland and reëntered



GERMAN OUTPOSTS

Winter had set in when the *Seeadler* after many delays finally put out from Hamburg. It was not long before the last lookouts of the German Navy had been passed. Under a full spread of sail they prepared to run the gantlet of the British mine fields.

the Atlantic. Axes and picks were busy chipping away the ice. It was hard work—but who cared, now that we were getting warm again? We were through the blockade and out of the Arctic—and now to test the "Freedom of the Seas" and give the Allies a touch of high life.

"By Joe," I said to my boys, "and they call it a blockade!"

You would have thought the fellow in the lookout was answering me.

"Steamer ahoy," he sang out.

"What? A steamer in these parts?"

I climbed aloft with my glasses. Sure enough, there was a British cruiser steaming toward us at full speed. She had the signal flying: "Stand by or we fire!" Such bad luck after such good luck! This second Christmas present was not so amusing. But now for our test!

"Hustle, you non-Norwegian chaps! Get below deck! Throw water everywhere to explain why our papers are blurred and wet. The storm we just passed through will make it seem the more natural. Schmidt, get into your finery. Remember, from now on you are the shy Josephine, the Captain's wife. If they put a prize crew aboard we shall capture the prize crew. If they suspect we are an auxiliary cruiser, bombs fore, midship, and aft, and we blow up the ship!"

Now for a big quid of tobacco in my mouth. I have never had the habit of chewing tobacco, but a Norwegian skipper would not be true to type without his quid; besides, a chew of tobacco gives you time to think. If somebody asks you an embarrassing question you can roll your quid around in your mouth, pucker up your lips slowly, and spit deliberately and elegantly. I had practiced rolling the quid and spitting until I thought myself a past master at the art.

But that smell, by Joe! The unexpected always happens to mar the best-laid plans—and help the worst. We had been running our motor full open. Because of the cargo of wood which sealed the deck, there had not been enough ventilation to get rid of the fumes. The characteristic reek of crude oil burning in a Diesel engine seeped up through the secret entrances placed in my cabin, and everything smelled of it. What will the search officer think when he smells a Diesel engine aboard a sailing ship? No use to burn punk or sprinkle eau de cologne.

"Stuff a rug in the chimney of the kerosene stove," I yelled, "and turn up the wicks of the oil lamps as high as you can." Stench against stench, kerosene smoke against the fumes of the motor! In five minutes my cabin smelled to high heaven of kerosene smoke.

The Britisher had hove to now, and we

saw that she was the *Avenger*,[1] a cruiser of some 18,000 tons.

"How's that?" I thought. "Why are the guns pointing? We are a peaceable Norwegian sailing ship. Why the guns?"

She had her big guns trained on us, and her officers were on the bridge looking us over with their glasses.

"Can we have been betrayed?" I asked myself. "Of what use is the best mask, of what use are the best men, if a traitor has done his dirty work?"

The thought of treachery always makes the fighting man tremble. I went into my cabin, and like the drowning man who grasps at a straw I remembered how before leaving port a friend gave me a parcel, saying: "My boy, take this package with you. But never open it unless you are in a tight fix. Then it may save you."

Well, we were in a tight fix all right, so I opened the package. I took off one wrapper after another. Ah! It was a bottle of rare old Napoleon brandy, almost priceless, made more than a hundred years ago.

THE CAPTAIN AND HIS "WIFE"

Before leaving port many dress rehearsals of their Norwegian rôles were staged until the crew was letter-perfect. The mechanic's helper who played the captain's wife had such large feet it was decided that she should be found seated if stopped by British patrols.

"What was good for Napoleon ought to be good for me. He fought against the British, too. Maybe this is just what we need." I took sixteen or eighteen swallows and with each gulp felt my cares getting lighter and lighter. Never did I thank God so much that I am not a teetotaler.

The cruiser had put out a small boat. Two officers and sixteen sailors were rowing toward us. We must receive them cordially, I thought. Going to the phonograph, I put on, "It's a long way to Tipperary." That will make the officers feel good. I also told the cook to stand in the door of the galley with a bottle of whisky in his hand. I know the British! I know what they like and I guessed that while the officer proceeded with his job his jack-tars would go poking about to see if they might find anything suspicious. I also suspected that they would go to the galley and sing out:

"'I there, Cookie, got any grog?"

Always give a British sailor a drink, or a German sailor, or an American sailor, or any kind of a sailor for that matter.

The boat was alongside. I began to swear at my men. It was hard for them to forget their naval habits, and, with an officer coming aboard, they were standing as stiffly as if at attention.

"Take the line, by Joe. Give a hand, by Joe. Don't stand there like wooden men, by Joe."

Then, too, it would sound natural to hear a Norwegian skipper swearing at his men.

The search officer clambered aboard.

"Merry Christmas, Captain."

"Merry Christmas, Mister Officer," I

[1] This vessel was a former merchant ship which became an auxiliary cruiser in the war.

replied, using the kind of broken English I thought a Norwegian skipper would use. I talk English with an accent, luckily about the same brand you would hear in a Scandinavian port. "But," I continued, "if you want to see what kind of Christmas we have had come along down to my cabin."

"A bit of a nasty blow this past week, eh what!" agreed the officer, "and from the look of your deck you've had more than your share of it. We went in behind the islands and waited for her to blow over."

"Yes, luckily for us," I thought to myself.

"I must see your papers, Captain." He got right down to business. Just then the phonograph struck up Tipperary, and he began to whistle the tune while his men made for the galley. I ushered the two officers to the cabin. The one who stuck his head in first retreated holding his nose.

"What a hell of a smell!"

"Excuse me, Mister Officer, but my stove is out of order. I could not know you gentlemen were giving me a visit to-day."

"Oh, never mind, Captain, that's all right, that's all right."

I had purposely hung my underwear up to dry so it would be in their way and so that in stooping to get under it they would see the name "Knudsen" embroidered on it. As the chief search officer crossed the cabin he suddenly saw my charming wife Josephine, with her blonde wig, her swollen jaw, and the rug hiding her big feet.

"Oh, excuse me."

"That is my wife, Mister Officer. She has been having a bad go with the toothache."

He was chivalrous, just as most Englishmen are. He might have been talking to a court lady, instead of that rascal Schmidt.

"Sorry, madam, to intrude like this, but we must do our duty."

"All right!" said my lovely but somewhat distorted better half in a high falsetto voice out of one corner of her mouth.

"By Joe, Captain, you haven't much cabin left, have you? You *have* been through some rough weather!"

"I wouldn't mind the rest, Mister Officer, but look at my papers. They are soaked, too."

"I can understand that, after the weather you've had."

"Yes, Mister Officer, it's all right for you to see them in this condition, because you saw the storm yourself; but later if I meet some of your comrades who didn't hit the blow that we had, they may not take my word for it. That's what's worrying me."

"Oh, don't worry, Captain. I'll give you a memorandum explaining the condition of your papers. You are lucky to have saved your ship."

That memorandum was just what I wanted. There was no telling when we might be searched again.

I had the papers scattered all over the cabin to dry and each time I handed one to him I spat a stream of tobacco juice on the cabin floor. He examined the papers with a practiced eye and made entries in his notebook. Each page in his book was for a ship, and I could see that thirty or forty pages had been used already. Yes, he was an experienced officer.

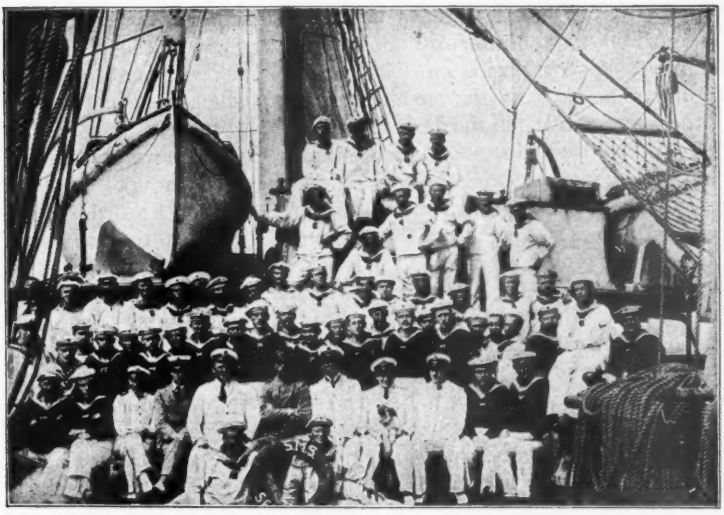
When he came to the last document, the one signed with the false signature of the British Consul at Copenhagen and sealed with a false British Imperial seal, and read the formal statement that the *Irma's* cargo of lumber was destined for the use of the British Government in Australia, he turned to me suddenly.

"These papers are all right, Captain."

In the excitement of the moment I suddenly swallowed my chew of tobacco. I was afraid this might give our whole sham away. So I coughed and coughed as though with a bad cold, trying to cover up what had happened. What would a British search officer think if a Norwegian skipper got seasick? My mate Leudemann was standing next to me holding the log. I had told him to have it ready in case the Britisher should want to examine it. Leudemann saw there was something wrong with me, and was quick-witted enough to divert the search officer's attention, by handing him the book.

"Oh yes, the log," exclaimed the officer, and opened the wet pages.

The quid of tobacco seemed to be mov-



IN UNIFORM
Once in the open Atlantic their Norwegian disguises were abandoned, the German colors flew at the masthead, and the crew appeared in their German uniforms ready for any emergency a raiding career might bring about.

ing up and down my gullet. I struggled with myself and to show an outward calm I said to Leudemann in Norwegian:

"I wish I'd had that officer's camel's hair cape and hood. It would have been fine to keep a fellow warm while up there north of the Circle."

"For rain and spray, too," the Englishman spoke up in Norwegian to show that he knew the language.

You must admire how careful those English are. The officer examined every page of the log.

"How is this, Captain," he exclaimed, "you were laid up three weeks and a half?"

There was a discrepancy in dates which represented our wait after the Admiralty had ordered us not to sail because of the return of the submarine, *Deutschland*, and the consequent increased vigilance of the blockade. I had not thought of it. Here was the one detail that we had neglected to provide for in our elaborately detailed preparations. Even if I had been in the best of health I should not have known what to reply. With that tobacco quid running around inside of my body I could only pray to God for help.

Again Leudemann saved the situation. He was a little fellow and simple-hearted, but a great character. When bad times came Leudemann was at his best.

"We didn't lie there for pleasure," he said in his dry way as he looked up at the big Englishman. "We had orders from our owner not to sail until we got word."

"How so?"

"Haven't you been warned, then, about German cruisers?"

"What's that?"

"Haven't you heard about the *Moeve* and the auxiliary cruiser, *Seeadler?*"

The search officer turned to me.

"What about this that your mate is saying, Captain?"

My stomach felt much better, now that Leudemann had spoken. So I thought I might as well give the Englishman a good dose.

"There were rumors at home in Norway, that two cruisers and sixteen German submarines had put out of port."

The search officer's comrade, who had been looking around the cabin, came over to us when he heard all this.

"I think we had better be going," he spoke up suddenly.

"Yes," replied the other, and they went on deck.

They made no attempt at questioning the sailors or investigating the sailors' belongings.

"Your papers are all right, Captain," said the search officer, "but you will have to wait here for an hour until you get a signal to proceed."

"All right, Mister Officer."

One of my boys who was of a pessimistic

turn of mind heard this. As he walked away from my cabin he said out aloud to himself: "Everything is lost."

Down below were the members of my other crew, waiting in the dark. They were right beneath the floor of the deck, straining their ears to catch any word that might give them an idea how things were going on deck. They heard the exclamation, "Everything is lost," and took it for the official word that we were discovered and for the command to do what was to be done in that case. They lit the fuses of the three bombs that were to blow up the ship, and waited for the hatches to be opened to let them on deck to the boats. The fuses would burn for fifteen minutes.

The British were in their boat now, trying to push off. But you can't hold a sailing ship in one place like a steamer. She keeps drifting. And the suction of the *Seeadler* as she drifted held their boat so it couldn't get away. What was still worse it kept slipping aft and if it got under our stern, they would have been sure to see our propeller. A sailship with a propeller? Yes, sometimes, but we should have been done for, as there was nothing to that effect in our papers. Seizing a rope I tossed it overboard toward them.

"Take the rope, Mister Officer," I shouted as though trying to help them.

That made them look up, so that the rope might not fall on their heads. I heaved the rope just as they were sliding around our stern and away. The officers thanked me, and one of them, angry with his men for not being able to push the boat off, exclaimed:

"I have only fools on my boat."

"Yes, maybe you have," I thought, "and maybe you are the worst fooled one of all!"

My stomach was quite nomal now. I was so happy that I even felt as though I could digest that quid of tobacco. The men on deck felt like cheering and singing, but they had orders to go on about their jobs as though nothing unusual had been going on, until the cruiser was far away. They just grinned, but so broad were the grins that I thought they would split their faces.

My first thought was to bring the happy news to the boys in the darkness down below. I went to one of the secret hatches, which they had fastened from within.

"Open," I shouted.

There were vague sounds below.

"Open up," I called again.

Then I heard a muffled voice say:

"Open the flood valves."

"What's that?" I yelled. "What's the matter? Open the hatch!"

The hatch opened. I saw troubled faces. I could hear water rushing into the ship.

"By Joe," I shouted, "are you trying to sink my boat?"

I could hear men running below to all parts of the ship. I climbed down roaring. One of the men spoke up.

"They are cutting the fuses and closing the flood valves."

"Fuses, flood valves, by Joe! How'd that happen, by Joe?"

Then one of the men said: "But some one called down that all was lost! Afterward you called: 'Open,' and we thought you meant open the flood valves."

The fuses had been burning for eight minutes out of their fifteen, and hundreds of gallons of water were in the ship.

By Joe, I looked for the fellow who said "All is lost." He came forward at once and confessed.

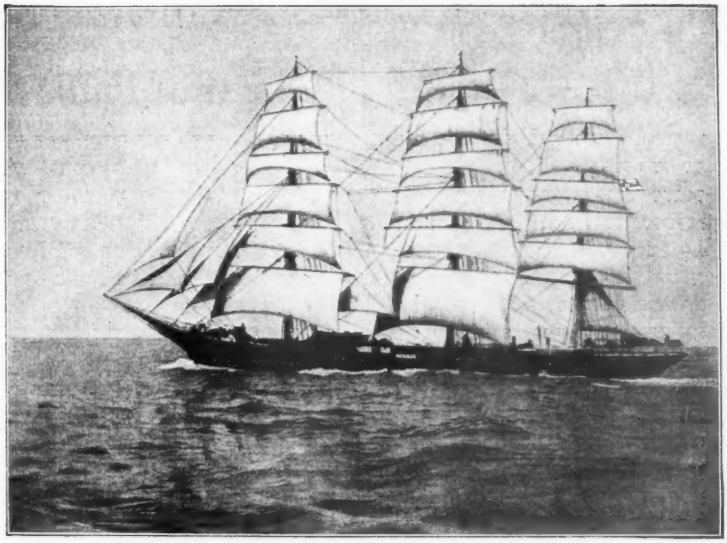
"I wasn't calling to the men below. I merely said it to myself."

"Why do you say: 'All is lost,' by Joe, just when everything is fine?"

"Well, Captain, when the Englishman said that we should have to wait for an hour, I thought to myself that the game was up. It means that he is keeping us waiting while he sends a wireless to Copenhagen asking about the *Irma*, when there is no *Irma*."

"By Joe," I said, "that's right."

In our excitement neither I nor my officers had thought about the wireless. It had not occurred to us to ask ourselves why we had been ordered to stand by for a whole hour. We didn't even think of Lloyd's Register. The search officer might have gone back to his ship to look up the *Irma* in the Register, where there was no *Irma*.



"HAPPY VOYAGE"
It was Christmas—and the Norwegian disguise had passed British scrutiny! Singing "Yo, Ho, Ho," and cheered by many bottles of rum, the merry crew jettisoned the cargo of lumber, cleared the deck for action, and raced southward before the wind toward the Atlantic shipping lanes.

For days I had been on deck in the storm and in the ice regions. For the past half-hour I had gone through worse turmoil even than that. And now, when everything seemed clear, the sky looked black again and that quid of tobacco started getting in its dirty work. I went to the rail and hung there on my elbows, staring through my binoculars at the *Avenger* and watching for the flag signal. My hand shook and instead of only one I could see three cruisers in my glass. I handed it to Leudemann and while he took a look I leaned there with the code book in my hand, ready to decode the signal when it came.

I don't know how long it was, fifteen minutes or an hour, but finally three little flags went up the signal rope. Old imperturbable Leudemann steadied his glass. At last he made out the signal: "T-M-B." I thumbed the book clumsily. It seemed as though I would never find T-M-B. But there it was. It meant "Planet." Nonsense! Read the signal again.

I was getting weaker and weaker, whether from the anxiety or from that quid I don't know. This time he read: "T-X-B." Pages, columns, and then the right place—"Continue voyage."

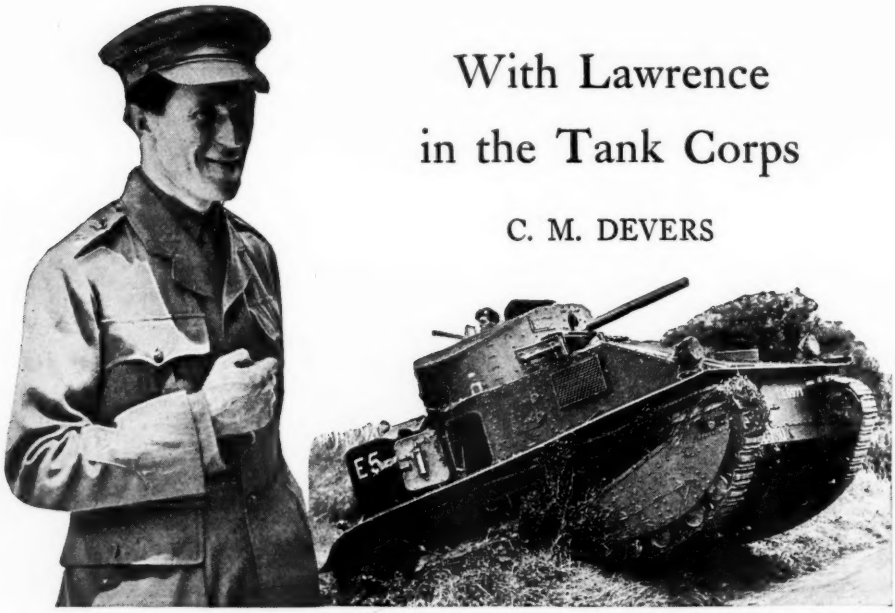
I felt as though my heart had two valves instead of one and pumping madly through both. I sat down and breathed heavily. Instead of going about their ordinary tasks my men wanted to yell like Indians.

"And now, boys, let's celebrate Christmas!"

We dumped our deck load of lumber into the sea, and cleared the deck for a big time. I had a Christmas tree that I had brought from home. We set it up. Before the *Seeadler* left port Fraulein Bertha Krupp had sent us a huge box full of Christmas presents, something for every man. We opened it and found clothing, cigars, pipes, cigarettes, cigar holders, knives, liquor, soft drinks, and musical instruments.

It was the merriest Christmas of our lives. Singing "Yo, Ho, Ho," and cheered up with many good bottles of rum, we headed south to play our rôle as buccaneers.

Dodging British cruisers and playing pirate with Allied commerce was a thrilling and risky business which is described in vivid and humorous detail by Lowell Thomas in his next installment of the adventures of Count Felix von Luckner and the Seeadler. *Gold coins and bottles of champagne were given as prizes to those on the* Seeadler *who sighted Allied merchantmen—and Luckner reports that even the captains and the members of the crews of captured vessels climbed into the rigging to scan the horizon for ships to sink.*



With Lawrence in the Tank Corps

C. M. DEVERS

After his great exploits in Arabia Colonel Lawrence served as "Private Shaw" in the Tanks Corps of the British Army, and a comrade in the ranks here records his impressions of the mysterious, adventurous, and shy genius who was Prince of Mecca, commander of a wing in Allenby's army, uncrowned King of the Arabs, and, finally, after the war, a private in the British Army.

THE PUBLICATION of one of the most remarkable books of our time has urged me to write this article, if only because my doubts concerning the real identity of its author—Thomas Edward Lawrence—have at last been set at rest.

Private T. E. Shaw, to give him his army rank and name when I knew him, lived and slept in one of the many wooden huts which formed, and still form, Bovington Camp, Wareham, Dorset, and where is stationed the 1st (Depot) Battalion Royal Tank Corps, in which Lawrence served as a private. Of the man Lawrence I know nothing. Of the man Shaw I know a little.

It is a private soldier's privilege to strike up an acquaintance with a comrade, which may lead to a lasting friendship, but with Shaw this never was possible. Shaw seemed unapproachable—unapproachable in the sense that he seemed to inspire respect, mere private that he was. He was, if I may put it, above and apart, but looking back one realizes that Lawrence had often triumphed as an actor.

Shorn of any disguise in camp—how could he attempt it?—he lived and soldiered amongst us as Shaw, but betraying by no word or sign that he was Lawrence. Had we known, had his officers known, that this great little man was with us and one of us, what little rest Shaw would have had!

I first knew him early in 1922, when he served in the Tank Corps. He lived simply, as he wished. He could not have lived more so as a private soldier. One never saw him on parade; indeed, he contrived, somehow, to be excused from all parades. Perhaps this was because he was on the staff, employed in the Quartermaster's stores as a clerk.

The only way during "off-duty" hours that we knew Lawrence was in camp was by the roar of the engine of his motor cycle —and this engine did have a most ear-piercing shriek!—a machine specially built for him, and one which appeared too big for its rider. That may be the reason why he exchanged it later for a smaller model.

New Light on the Mysterious "Uncrowned King of Arabia"

It seems hardly typical of the man that it had a powerful headlight, and this, particularly at night, coupled with the roar of his engine and his love of "scorching," combined to make Shaw the terror of the village, and even the camp roads. On the conclusion of duty for the day, Shaw would cycle off at high speed along the Wool Road to a neighboring hamlet. Here, I learned afterwards, he rented a small cottage, of which he was the sole occupant. Here, without doubt, he did most of his writing and study. At other times he would cycle into Dorchester, but one never saw him enter or leave the house of his friend, Thomas Hardy, of Max Gate.

Courteous to all, and even distinctly popular, I never knew him to be much in company. Military duties over, his time was always spent out of camp. Possessed of a "permanent" or midnight pass, which concession was allowed men employed on the staff, Shaw would soon be eating up the roads on his machine and be miles away on some mission, and would, on his late return to camp, stealthily creep into his humble bed.

His tunic was always bare of ribbons or, indeed, any decoration, and he seems to have utilized every conceivable means of hiding the real man. In this he succeeded remarkably well. A slight, almost girlish figure, with a not too impressive ruddy face, clear, kindly eyes, and fair untidy hair, a young man with whom to associate the daring exploits recorded by his own and other hands, would seem laughable. He was, as has been said of him, a mystery; and as a private soldier, his acting, so natural, so unaffected, deceived the many of us with whom he came into daily contact. One wonders now, when one realizes who Private Shaw really was, what his thoughts must have been when with us in that hut.

Quite naturally, among a body of men living together, jokes would be "cracked" not infrequently, and coarse language used. Shaw seldom sat in the circle, which invariably formed itself, of a winter's night, around the stove, but I remember him, on one of his infrequent nights-in, seated on his bed or box. If any of the conversation arrested him, he would look up in such a knowing way and his shy smile would presently expand to a grin. Of studious nature and habits, Shaw was never seen at any of our sports, never participated in our games. His bicycle seemed his inseparable and only pal.

It must not be thought that Shaw deliberately cut himself off from those of us

CATERPILLARS MOVING INTO ACTION

The man whom Lord Allenby dubbed "Arabia's Uncrowned King," who had led the desert's hordes to success against the Turks, and who had personally blown up seventy-nine railway bridges, must have found war manœuvres in England's peaceful countryside rather tame affairs.

whom he knew, for he was always bright and cheery, and had a friendly word for any one who spoke to him. He was seldom in camp over week-ends. On these occasions a suit case always accompanied Shaw—where, no one knew. Our adjutant must have signed this great man's pass often, "with permission to wear civilian clothes." The destination on the bearer's pass would perhaps be situated miles from his actual objective.

Where Lawrence is now I do not know. It is like him to wish to remain in obscurity. Even when you have served with him and seen him daily, he is still a mystery, this Oxford scholar and gentleman. That he was originally in the Royal Air Force as a private there is no doubt, but he was "discovered" by one of its officers, and it became necessary for Shaw to seek refuge elsewhere—hence his enlistment in the Royal Tank Corps. It is rumored he is again in the Air Force in India, still in the rôle of a private.

It was not until a few months prior to my leaving the Service that I became aware of Shaw's real identity. I first remember the stir created by the chance remark, passed by one of us, who happened across a photograph of Lawrence as Prince of Mecca, as to the striking likeness of the picture to our chum Shaw. Gossip soon got busy, the rumor spread with marvelous rapidity, and it looked as if Shaw would, once again, have to "gather up his tents" and seek another regiment, where he could be left in peace. Careful comparison was made by all of us in the hut of the halftone taken from one of the illustrated weeklies in the army rest room and its very original within a few feet of us.

The black wooden box at the foot of his bed, issued alike to all of us, contained some of his now priceless drawings, papers, and maps, and which must have been a source of constant worry to him. Shaw did occasionally show to a privileged few of his hut-mates, from time to time, some paintings and mysterious pictures which he doubtless judged would convey no clue; but this fact, and the striking likeness he bore to the photograph in question, only lent strength to the general discussion—always in his absence, be it understood—as to whether Lawrence was actually amongst us.

The news spread eventually to the Orderly Room, where the whole idea of Colonel Lawrence being in our midst was tabooed. How silly of us to think it was he! Of course, every one ought to know Lawrence was hiding in the Air Force. It was ridiculous even to dream that he could possibly be in the Tank Corps!

The suspicion remained for some while. We kept even more respectfully aloof from him. I am not afraid to say that this aloofness was born of fear. As for Lawrence himself, he simply went about still as Shaw; but, I have no doubt, he could not help overhearing our whispered deductions or fail to note our very suspicious, though kindly and admiring, glances in his direction whenever he was in camp.

TANKS BREAKING THROUGH AN INFANTRY LINE

Colonel Lawrence, chafing at army discipline in Cairo, found a field for his peculiar talents among the desert nomads of Arabia. In peacetime, shunning the publicity accorded a hero, may not his effort to escape unfold some new opportunity for splendid achievement?

Such was the excitement at the time that I have no doubt Lawrence spent many an hour after "lights out," when we were all asleep, planning some means of escape by reënlistment elsewhere or by "desertion."

If Lawrence should ever see this he would remember me, and now that I am a civilian I hope I shall not have offended Private Shaw, either in writing down these recollections or, even worse, in admitting that when passing by his bed one day I saw protruding from beneath his pillow a small corner of an envelope. It should be remembered, as a poor defense, that round about this time we all were agog with excitement as to who the man was. I hope I may be forgiven, especially by Shaw himself—but if ever I felt a sneak, I did then. I went to his pillow and pulled it out. The envelope bore an address, other than the camp, and the person addressed on that envelope—I remember the sight of it to this day—was Colonel T. E. Lawrence. The envelope had been opened and even then contained a letter. Half-afraid, I replaced both. A more venturesome mate would perhaps have extracted the letter and read it, but that went against the grain with me. A few moments later Shaw came in.

I have nothing to gain by saying that I came across a letter addressed to him as Colonel T. E. Lawrence, nor was my looking at it to my credit. The fact remains, and will always remain, that my eyes could not have deceived me, and there is no possible doubt whatever about it. Would Lawrence say to-day how careless it was of him? But I hope to have the honor of apologizing to Private Shaw one day.

The man is a born actor. He deceived us all: so quiet, so inoffensive, and even gentle that even now I cannot believe that it is he who has led Arab armies, blown up seventy-odd bridges, miles of railway line, suffered torture, hunger, and other privation. There is without doubt in him an innate love of being mysterious. Certainly, he never talked much with us—that is, in general conversation. His manner, his

accent commanded respect—so much so, that one simply had to listen intently whenever he did speak to us, whether individually or collectively. Why we should do so was not even questioned, but that we did is certain.

Although one of us, he never messed with us. Never once do I remember having seen him in the mess room. The camp boasted several little refreshment canteens, permitted by the authorities and run by civilians. Shaw would patronize one of these. He made himself so obscure that even his daily absence from the mess room excited not the slightest suspicion or comment. He was simply envied as one who must have private means. Another thing I can say: Shaw was never on pay parade.

If my readers, or those who have been fortunate enough to read his "Revolt in the Desert," picture Shaw as a big, powerful man, let me repeat at once, that he was one of the smallest men of the company and most certainly the quietest. He was, or appeared to be, always in the background.

His washing was done by a woman in Wool village and brought up with ours, in a soapbox on baby-carriage wheels, by an old man. Such is fame! I have seen this great little man airing his army shirt and underclothing before the barrack room fire. Even in commonplaces he was not, somehow, one of us. One felt that to speak to him, to crack a joke, you had to think twice.

What must he have thought, reading, as he must have read, regularly—this man who had made kings and was himself a Prince of Mecca and a world hero—our Battalion Daily Orders, laying down special instructions for the coming visit of this or that "brass hat"?

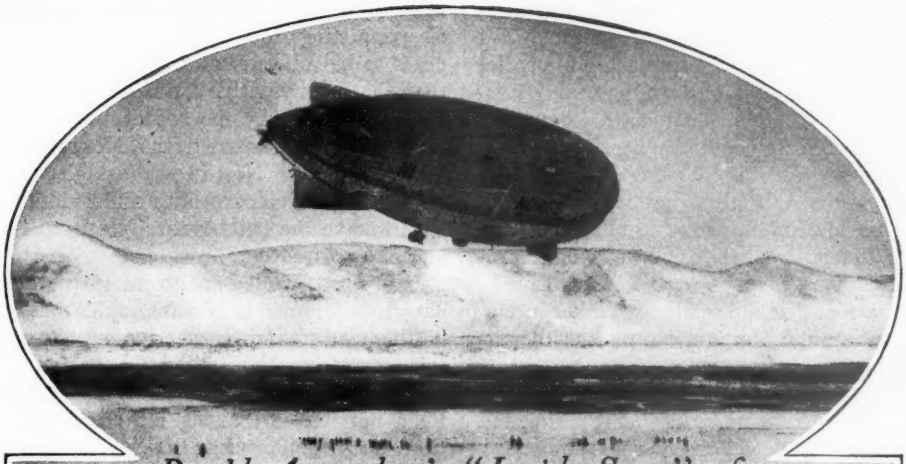
Shaw appeared to dislike discipline. If anything he was careless in most military things. Yet he certainly had some method —some system of his own. One never saw him about his quarters much. His bed would be made, his floor cleaned and his kit, but not by Shaw. I never saw him drink or smoke.

He kept his secret well—so well that, beyond a few days' excitement in the camp, he lived as he had intended to live until his purpose was achieved.

Shaw could have been promoted from the ranks, had he so wished, time after time. The educational standard required in all recruits nowadays is so high that a soldier's promotion can safely be said to rest almost entirely upon the possession of one or more Army certificates of education and so that a recruit may have an opportunity to increase his knowledge, classes are made a compulsory parade and periodical and strict examinations are held by the authorities.

A recruit, after the requisite period of tuition under an Army schoolmaster, is required to sit for what is known as a third-class Army certificate of education. Should he fail in this, he is given further instruction in the same subjects until the next examination in this class. These subjects are of such an elementary nature, that if he should still fail to show promise of any progress, he is usually discharged on educational grounds. If successful in obtaining a third-class certificate, he would still attend school with a view to a further examination for a second-class certificate and so on, until the first and special certificates are obtained. A soldier, to win promotion in the Army to-day, must have one or two such certificates, but in any case the attendance at school of all soldiers is compulsory.

I mention this because I remember that in the case of Private Shaw, who had only then arrived at the battalion, much correspondence went on as to whether he would be required to attend school at all. This was brought about by the fact that a then recent Army order stated that if a man could produce some recognized college or public school certificate he was deemed educationally fit enough to be exempt from any Army school training, and that such private records should be equivalent to any Army certificates for the purposes of military training. As Lawrence could produce such certificates he never attended the Army school and I was present in the Battalion Orderly Room when this fact was noted upon his attestation papers.



Roald Amundsen's "Inside Story" of

The Rows Aboard the Norge

The Explorer Complains that Nobile Nearly Wrecked the Airship over the Arctic, but Tried to Seize the Honors

THE INSIDE STORY of the *Norge's* flight over the North Pole in the summer of 1926 has never been told. I should not tell it now were it not that so much misrepresentation has been broadcast about it that simple justice to myself and my companions compels me to reveal all the facts.

There is, of course, an inside story to every undertaking. Wherever a group of men get together to do a difficult task, misunderstandings are bound to arise, clashes of temperament occur, incidents happen that are best forgotten. Polar expeditions are no exception to this rule. I have yet to hear of one that did not have such episodes—not only my own expeditions, but all others with which I am familiar. It is a pleasant and proper trait of human nature to try to forget these things when success has crowned one's efforts. Such has been my instinct.

However, I must for once break this rule. It is not only that the provocation this time is greater. I could let that pass. But if I should leave the truth about the *Norge's* flight to be gathered by the public from the mass of misrepresentation of the facts which has been poured forth by Italian propaganda, I should be permitting a gross injustice to be visited, not only upon my own reputation, but upon the hard-earned laurels of Lincoln Ellsworth and my Norwegian compatriots who so essentially contributed to the success of that expedition.

A flight from northern Europe to northern Alaska, straight across the Arctic Ocean, and incidentally across the North Pole, had been a dream of mine since 1909, when word reached the world that Admiral Peary had captured the Pole and had left for later explorers only the study of the uncharted Arctic seas. The reader will recall my numerous attempts to make this passage by air, including my preparations in 1909, 1914, 1922, 1923, 1924, and 1925. In 1925, at Spitsbergen, Riiser-Larsen

had brought word to Lincoln Ellsworth and me that the Italian dirigible *N-1* could possibly be purchased at a price that we could afford to pay, and Ellsworth had then offered to contribute $100,000 if we could buy her. In the light of these years of planning for the flight across the Arctic, how preposterous is the claim now brazenly sought to be established by the Italians, that Colonel Nobile conceived and engineered the *Norge* expedition, or that he had any other useful function in it than that of pilot of the airship.

Nevertheless, precisely this preposterous claim is now assiduously being insinuated into the public consciousness by every art of subtle propaganda. Just how false this fantastic tale really is, I intend to demonstrate. I shall give the facts in their chronological order.

When we considered the idea of buying the *N-1* [*Norge*] from the Italian Government, the obvious thing to do was to consult with Colonel Nobile, because he was the man who could answer exactly every question we should raise regarding her cruising radius, lifting power, and all other necessary details for our information. Equally obvious also it would be that, if we bought the *N-1*, Nobile would be the ideal man to employ as captain or pilot. He was both designer and pilot. He had designed the plans from which the semi-rigid airship was built, and he had been her commander during the two years of her service with the Italian Army. He had handled her on many flights, and of course would be familiar with every trick and peculiarity about her.

Nobile came to Oslo in response to a telegram. Our first conference was at my home. Riiser-Larsen was also present. Nobile immediately demonstrated that he had come armed with full powers from the Italian Government, for he at once made us an offer which astonished us and which in the light of later events was most significant. This offer was that the Italian Government would make us a free gift of the *N-1* upon one condition, namely, that we should agree that it should fly the Italian flag. This offer we instantly rejected. I had not the slightest intention of permitting my dream of seventeen years to be fulfilled under any other flag than that of my native land. I had spent a lifetime learning the art of polar exploration. I had carried the Norwegian flag through the Northwest Passage and to the South Pole. Nothing could induce me to make the first Arctic Ocean crossing under any other.

It is worth while here to interrupt the narrative for one brief paragraph, to fix in the reader's mind the significance of this offer from the Italian Government, delivered to me by an officer of its army. I did not realize that significance at the time, but it is now clear that it was a deliberate effort on the part of the government to gain for the present Italian political régime in particular, and for the Italian people in general, a world-wide advertisement. My idea of a transpolar flight was thus subtly to be appropriated as their own by the Italians, and my skill in Arctic exploration was to be utilized as the means of a dramatic achievement for which the Italians would take the credit. Fortunately, my instinct and my pride of race saved me from falling into the trap, even though I did not realize at the time that it was being laid for me. Unfortunately, however, I could not foresee how far the Italians would later stoop in their effort to claim a major share in the honors of the flight. These things came later, and they will appear later in my narrative.

When I had rejected Nobile's offer of the *N-1* as a gift, I asked him the price at which we could purchase it outright, free of all conditions. In reply, he pointed out that the *N-1* had cost the Italian Government $100,000 to build. She was now, however, two years old, and though still in good condition had borne the strains of many flights. As her military usefulness was now approaching an end, he was authorized to offer the ship to us for $75,000 and to agree to deliver her to us in perfect condition.

Naturally, we were delighted at this offer. Lincoln Ellsworth had guaranteed $100,000, and here was the opportunity before me to acquire, for approximately

$25,000 less than that, just such an airship as I had dreamed for years of possessing. After a discussion of details, we accepted Nobile's offer.

We two went to Rome the following month (August, 1925) and there signed the contract of purchase.

On this visit to Rome there was further discussion of details. I had asked Nobile, in the conference at Oslo the month before, if he would go with us as pilot, and he had agreed. Now, in Rome, he asked that the crew be made up entirely of Italians. To this suggestion I declined positively to agree. I had several reasons. First of all, I intended that the expedition should be primarily a Norwegian-American enterprise, as I had planned it a year before. Ellsworth's financial assistance had made the flight of 1925 possible and would make the flight of 1926 possible. Ellsworth and I had been congenial companions in danger and in achievement. I was delighted to share the national honors with my beloved American friend. I did not intend, however, to share them with the Italians. We owed them nothing but the opportunity to buy and pay for a second-hand military airship. I was very glad to be able to hire the Italian officer who had constructed and piloted this ship. But the expedition was Ellsworth's and mine. It was our idea. It was financed with our money, and it would be made in a craft which we had bought and paid for.

Another consideration was this: Riiser-Larsen, the pilot of the *N-25*, and Omdal, the mechanician, had shared our perils in the flying boats the year before, and I intended that they should share the honors in the coming flight. Not only the honors, but also the highly important duties. Riiser-Larsen, I considered one of the greatest aviators in the world. His skill and judgment would be invaluable. Omdal was one of the greatest geniuses in practical mechanics, and he too would be invaluable in emergencies.

I was determined also to share the flight over the North Pole with Oscar Wisting, one of the gallant four who had accompanied me to the South Pole. I wanted him to share with me the distinction of the incidental crossing of the North Pole on our impending transoceanic flight.

GENERAL NOBILE AND "TITINA"
Nobile's mascot, who had been on every important flight of her master, made the transpolar air crossing with a placid mind and only whimpered when the winds became boisterous after the *Norge* had passed south of the Alaskan coastline.

All these considerations were fully explained to Nobile and understood by him. Nobile then asked permission to take five Italian mechanics with us on the flight. He pointed out that the men he had in mind were members of the present crew of the *N-1* and were experienced in handling the motors and operating the gas valves and ballast. In discharging his functions as pilot on the flight, it would greatly simplify Nobile's work if he had under him these men accustomed to handling the craft and able to take their orders in Nobile's native tongue. These points were perfectly reasonable, and I readily assented to his request. It was, therefore, definitely agreed that our expedition should include Nobile and the five Italian mechanics, but no more Italians than these.

An incident of our stay in Rome, on this

occasion, gave me my first twinges of apprehension about Nobile. Riiser-Larsen and I wanted to take a trip to the bathing place called Ostia, not far from Rome. Nobile proposed that we make the journey thither as his guests in his automobile. We gratefully accepted the offer.

This was the wildest ride I have ever taken in any craft. Nobile proved to be a most eccentric chauffeur. So long as we were proceeding on a straight and level stretch of highway he drove steadily at a rational speed. The moment, however, we approached a curve in the road where an ordinary driver would slow down as a matter of course, Nobile's procedure was directly the opposite. He would press the accelerator down to the floor, and we would take the blind curve at terrific speed. Halfway round, as I was convulsively tightening my grip on the seat with my hands and shuddering with fear of disaster, Nobile would seem to come out of a cloud of abstraction, realize the danger, and frantically seek to avert it. He would jam his brakes on with all his strength, which, of course, with our centrifugal momentum, threatened to topple us over. To prevent this, he would then start zigzagging with the front wheels.

After repeated expostulations, we finally persuaded Nobile to observe some semblance of sensible driving, but his whole performance on the round trip was evidence of his extreme nervousness, erratic nature, and lack of balanced judgment. When Riiser-Larsen and I got back to our hotel and were alone, I expressed the gravest apprehensions regarding our wisdom in agreeing to take Nobile as our pilot on the dirigible. If, I exclaimed, this is a sample of his disposition on firm ground, it would be madness for us to trust ourselves with him in the air. Riiser-Larsen's reply astonished me.

"No," he said, "that does not follow. Some of the steadiest, coolest aviators I know are men who on the ground have exactly this fellow's nervous characteristics. In ordinary life, they strike you as excitable and erratic. But the moment they take to the air—it may be the steadying effect of the stimulation of danger—their nervousness disappears and they are as cool in an emergency as any one you could imagine."

Riiser-Larsen's explanation seemed plausible, and I accepted his reassurances —all the more readily because I had observed his own trepidation in the automobile with Nobile. Surely, I thought, if he can believe in this man's capacity in the air after this experience with him on the ground, I need not have doubts about it. Nevertheless, Nobile on several occasions during the actual flight across the Arctic revealed exactly the same qualities he had exhibited at the wheel of the motor car, and more than once put us in peril of disaster.

When Ellsworth and I realized that we should both have to be away from Europe all that winter, we realized also that questions would arise involving all kinds of detailed negotiations with the Italians over unexpected problems. Some competent authority on the ground must be ready to represent our interests, handle our finances, and make decisions. In this dilemma, we made an arrangement with the Aëro Club of Norway to act for us. At the time, this seemed a fortunate solution. To-day, it is clear enough that it was a mistake of the first magnitude.

The Aëro Club of Norway was a small organization, unknown outside of Norway. The president was Dr. Rolf Thommessen. He was the editor and owner of one of the largest daily papers in Norway, and a man of means. He was assisted in this special business by Major Sverre and Secretary Bryn. When I speak of the Aëro Club of Norway, I am speaking, for all practical purposes, of these three individuals. They subsequently caused us troubles so numerous as to outweigh any services they rendered us. Indeed, most of the misunderstandings that have arisen in the public mind about the facts of the flight of 1926 are traceable directly to the mismanagement and weakness and vacillation of the Aëro Club of Norway.

These troubles began as early as January, 1926. In that month, Nobile went to Oslo to sign his contract as pilot of the expedition. As Ellsworth and I were

in America, he dealt with the Aëro Club as our agents. After a discussion of terms, a contract was drawn up and both parties signed it. This contract included a provision that Nobile should receive for his work as pilot the sum of 45,000 kroner.

Nobile, since the flight, has been trying to make it appear that he was equally, with Ellsworth and myself, responsible for the expedition, and that, like us, he was one of the unpaid leaders. The fact is, his contract of service with the expedition specified his salary and made him, as we had always intended, a hired employee.

The day after Nobile had signed his contract, he asked for another meeting with the Aëro Club, and there made an astonishing demand. He declared that he was already under contract for a flight in Japan during the same period which would be occupied by the flight of our expedition across the Arctic Ocean. To accompany us, he pointed out, meant that he would have to cancel his Japanese contract and lose the money it would have brought him. Of course, he must have known all this the day before, when he had set 40,000 gold lire as his own remuneration and had signed the contract containing that provision. Now, nevertheless, on the day following, he gave this Japanese contract as his reason for demanding an additional 15,000 kroner.

The Aëro Club at this point should certainly have showed its mettle. Anybody of strong character and ordinary good judgment would decisively have resented this proposal. How could they expect to preserve the discipline of the expedition if they weakly yielded to this impudent demand? I am even yet at a loss to imagine what Thommessen could have been thinking about, to knuckle under to this piece of brazen effrontery. But instead of meeting this issue with courage, he weakly gave in.

LEVELING THE ICE TO BUILD A TRACK

On May 25, 1925, the five men of the Amundsen-Ellsworth expedition took off from Kings Bay, Spitzbergen, in two Dornier Wal planes. Forced down and frozen in, they abandoned one plane and labored desperately for three long weeks to rise again with the other. Track after track was built, only to be ruined by shifting pack ice, but on June 15th, their efforts proved successful and they reached the open sea and a sealing ship which rescued them.

When we arrived at Rome, we went into conference with Thommessen, the president of the Aëro Club of Norway, who had preceded us there. It quickly became apparent that Thommessen had lost his head completely. Whatever the Italians wanted done, Thommessen was even more eager than they to do. I have never been able to determine whether the Italians had flattered him out of his self-possession or whether the prospect of an Italian decoration, which he later got, had destroyed his sense of proportion; in any event, he appeared to be considering only the wishes

of the Italians and to think very little either of the pride of Norway or Ellsworth's and my interests, which he was supposed to represent.

First of all, Thommessen presented to Ellsworth and me a fresh proposal from Nobile. This was that we should add Nobile's name to the designation of the expedition, so that it should be called the Amundsen-Ellsworth-Nobile Polar Expedition. We could see no sense in this proposal and immediately rejected it. Thommessen, however, pressed the point with great insistence. He explained that Italian local pride was running high, and he greatly feared, unless we made some concession to it, that means would be found to hinder us from getting possession of the *Norge*.

He assured me further that the addition of Nobile's name was to be made only in compliment to Italy, and that it would never be heard of outside that country. The world already knew of the undertaking under its proper name of the Amundsen-Ellsworth Expedition. No publicity would be given to Nobile after we got the *Norge* out of Italy, and no one would be deceived. Meanwhile, we should gratify local pride while we were taking the ship over. On these representations, we consented to add Nobile's name. We did not consent, nor should we ever have consented, to include him as having a share in the command.

Thommessen's next point was a request for the money for the insurance of the dirigible. This, we agreed, was a perfectly reasonable demand.

Now Thommessen made a final proposal. He asked if Ellsworth and I would call on Nobile. At this preposterous suggestion, I lost control of my patience. With great indignation, we inquired of Thommessen if he had lost his senses completely. Ellsworth and I were the commanders of the expedition, and Nobile was to be the hired pilot of a ship bought with Ellsworth's and my money. It was all very well to gratify local Italian pride by temporarily adding Nobile's name to ours in the title of the expedition, but I intended to have no misunderstanding as to Nobile's true status, and I certainly had no intention of putting myself in the absurd position of making a formal first call on a hired subordinate. Naturally, that ultimatum closed that subject. Nobile later paid his call.

Meanwhile, I had been holding conferences with the Norwegians whom I had selected as members of the expedition. They had been in Italy for some time to take part in the trial flights of the *Norge* before she should be delivered to us. Now I began to hear a lot of things that made me very angry. The tension between the Norwegian crew on the one side and Thommessen, Sverre, and Nobile on the other side was at the bursting point.

Worse things yet now came to light. When Nobile called on me, he at once started demanding all sorts of absurd concessions. First of all, he wanted the Norwegian, as well as the Italian members of the crew, to take an oath of personal allegiance to him. I rejected this insolent suggestion with indignation and emphatically pointed out to Nobile in plain terms that he was nothing but a hired pilot.

For the benefit of the non-nautical reader, I should here explain the distinction between the captain of a vessel and the commander of an expedition. This distinction applies equally whether the craft be a ship in the water or a ship in the air. The captain of a ship necessarily has to be in supreme command of its physical operation. A crew cannot take orders from two different men. Therefore, all orders for the handling of a ship must come from the captain. He is solely and absolutely responsible for every detail of its physical management while in motion. Helmsman and engineer and crew must respond to the direction of a single mind and will.

All this, however, relates solely to the physical management of the vessel. On an exploring expedition, where the vessel shall go is absolutely within the province of the commander. He defines the objectives, and the captain of the vessel carries the commander's orders into effect by so ordering the management of the

ship as to make it proceed safely to the point designated by the commander.

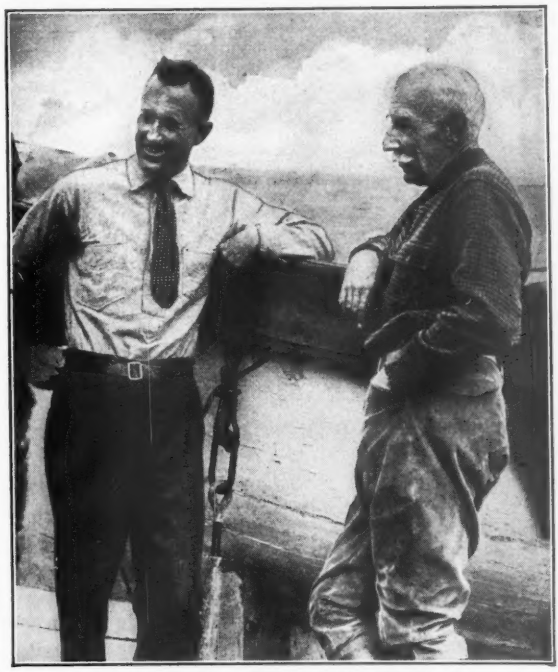
It was this sharp distinction between the functions of the skipper of the *Norge* and the commanders of the Polar expedition—Nobile being the former, and myself and Ellsworth the latter—which Nobile either could not, or would not, get into his head. The demands he made were efforts to usurp our function as commanders. Our responses to these demands were uniformly and emphatically and explicitly in the negative.

The foregoing will explain Nobile's next demand and my answer. Nobile wanted to stipulate that if, in his judgment, when we got to the North Pole, the air conditions were unfavorable to continue the flight southward to our objective, Point Barrow, he should be at liberty to turn the *Norge* back and return to Spitzbergen. To this request I responded with a blunt and emphatic "Nothing doing." We explained again to Nobile that his sole function was skipper of the ship. Our function was command of the expedition, and our orders as to where the ship should go must be unquestioningly accepted.

"Then," pleaded Nobile, "will you consult my opinion?"

"Certainly," we answered; "we should be very stupid if we did not get the skipper's expert opinion of what he could do with his ship before making any decision."

Nevertheless, we should make the final decision and he would have to abide by it. We also explained to him again that we were not interested in getting to the North Pole—that the whole object of our expedition was to make the continent-to-continent flight across the Arctic Ocean—and that nothing short of obvious inability to complete that flight would have the slightest influence in persuading us to turn back at any point along the course.



SUCCESSFUL ARCTIC ADVENTURERS

Lincoln Ellsworth (left) and Roald Amundsen, leaders of the *Norge* expedition in the first crossing of the Polar Sea. The photograph was taken as they were returning to the United States from Alaska aboard the S. S. *Victoria*.

Nobile then asked for a repeated assurance that he should be consulted, asking that any final decision we should make should be after a conference of four of us, namely, myself and Ellsworth, Nobile and Riiser-Larsen. As these were obviously the four people I should certainly consult in any event, I had no hesitation in answering "Yes."

In the light of what has since happened, it is now clear enough that Nobile, in all of these manœuvres, was trying desperately to insinuate himself into a position of major command of the expedition. Later events on the flight convinced me that this was not merely the product of Nobile's personal vanity and ambition—though these were great enough, in all conscience. I became pretty well convinced that he was also acting under orders from the government. They saw an opportunity to seize the credit for our exploit as an Italian achievement, and they used every device to attain this end.

Finally came the great day for us formally to take over the dirigible from the Italians. The *N-1* was now officially renamed the *Norge*. Naturally, I had insisted not only that the ship should fly the Norwegian flag, but also that she should bear the name of my country. The Italians made the event literally "a Roman holiday." Thommessen took over the ship. The Italian colors were lowered and the Norwegian hoisted. Without our knowledge, the Aëro Club had given permission also that the ship should bear her old name, *N-1*, as well as her new name *Norge*, and at the same time had agreed that the Italian colors should be painted on the hull.

Ellsworth and I immediately returned to Oslo by train. Neither of us had the slightest interest in the celebrations that we knew would mark the *Norge's* progress from Rome to Spitzbergen. Nobile has of late declared that this flight from Rome to Spitzbergen was far more dangerous than the one from Spitzbergen to Point Barrow. Even the most uninitiated reader can surmise how silly this claim is. The *Norge* had made hundreds of flights over various parts of Europe before we took her over. She was piloted through France by an experienced French pilot; over the English Channel, England, and the North Sea by an experienced English pilot. The journey was a perfectly safe one. For Ellsworth and me to have made it would have been to waste our time.

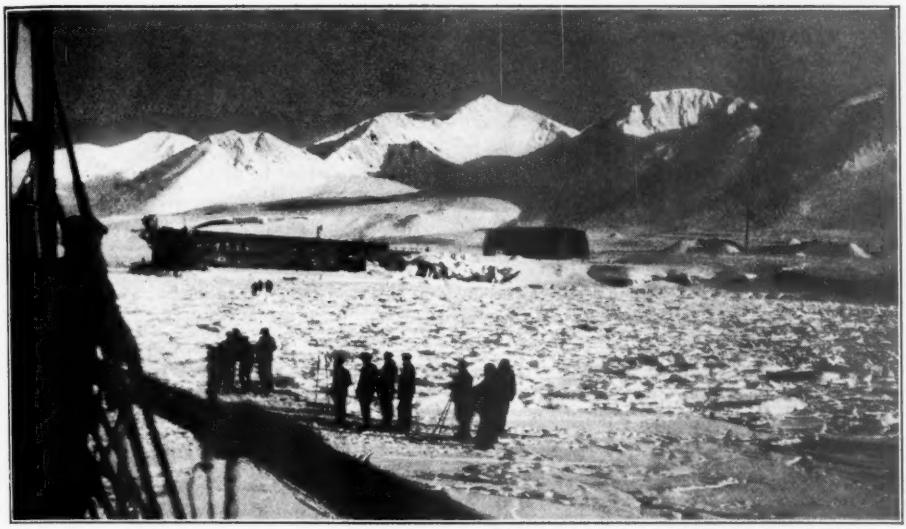
Safe as the journey was, Nobile grossly mismanaged even that. Besides the necessary foreign pilots taken aboard at Rome to guide the *Norge* over other lands, Nobile permitted on board a large number of newspaper correspondents, and guests who traveled for the mere notoriety of the experience. One result was discomfort for everybody on board. Another result was the wholly needless discomfort of the Norwegian members of the expedition—Riiser-Larsen, Omdal, and the others of my boys.

My old friend Dr. Adam, of Berlin, had generously made flying suits to measure for every member of the expedition. These suits were skillfully made, with a knowledge of the bitter weather to be encountered in the north. They were as light as possible and yet as warm as was necessary. Dr. Adam shipped these suits to Rome in ample time to arrive before the *Norge* started. They were on the ground ready to be used. At the last moment, Nobile declared they could not be carried because of their weight. Riiser-Larsen, therefore, and the other Norwegians had to make the flight from Rome to Spitsbergen clad in ordinary street clothes.

The Italians, however, when the *Norge* was ready to rise at Rome, appeared on the scene clad in magnificent fur coats and equipped with every other comfort of apparel. Throughout the journey the Norwegians suffered intensely from the cold. Even Riiser-Larsen, rugged giant that he is and bred to the Northern climate, arrived in Spitzbergen with his teeth chattering. The whole incident was an exhibition of brutal lack of consideration on Nobile's part. There was no reason in the world why the Norwegians should not have been allowed to wear their suits. Nobile himself and his Italian comrades were supplied. The suits for all the Norwegians combined certainly weighed less than the weight of one man. Nobile carried several unnecessary passengers on the flight, any one of whom could easily have been left behind.

Before the *Norge* left Italy, Nobile took Riiser-Larsen to one side and made him promise that "if we have to get down on the ice you will not leave us Italians and save yourselves." That the man who now has the effrontery to try to belittle the parts played by Ellsworth and myself and my Norwegian compatriots in this expedition—that this man had let the thought even enter his head that men of our past record could be so base that he would need such a reassurance, only reveals his own mind!

Before I go any further, I want to speak of the five other Italians on the expedition. These five subordinates were fine fellows. They were skilled in their several occupations. They were always good comrades. We liked them all. Wherever in this narrative I may speak in criticism of the



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KINGS BAY, SPITZBERGEN, BASE OF POLAR FLIGHTS

Looking over the bow of a ship attempting to force an entrance into the ice-locked harbor at Kings Bay, on an evening in May, 1926. The *Norge* hangar is to be seen in the center. Commander Byrd used Kings Bay as a base for his successful polar flight.

Italian contingent on the expedition, I mean Nobile specifically and only.

A few days before the *Norge* arrived at Spitzbergen, Commander Richard E. Byrd of the United States Navy arrived on his ship *Chantier*. A lot of misrepresentations about our attitude toward Byrd's expedition have been foisted on the public mind by unfriendly correspondents. I shall, therefore, take this opportunity to describe in some detail exactly what happened and why. So far as Commander Byrd himself is concerned, this explanation is quite unnecessary. He fully understood the reasons for everything that happened, and he and I were then and still are on terms of the most cordial friendship and mutual understanding.

The quay of a Norwegian coal company was the only facility at Kings Bay for discharging cargo from a vessel. It was so short that only one vessel could be tied to it at a time. When the *Chantier* arrived, that space was occupied by the *Heimdal*, the vessel which had brought some of our men to Spitzbergen. The *Heimdal* was at the moment taking on coal and water. More important than this, however, she was engaged in making essential repairs to her boiler, which was out of order. And most important of all, the *Norge* would soon be on her way from Gatschina to Spitzbergen, and the captain of the *Heimdal* must be ready at this time to come to her assistance if such be needed. For these reasons, it was impossible for the *Heimdal* to move away from the quay to anchorage in order to make room for the *Chantier* to tie up and unload.

It would be only a few days before this could be done, but Byrd was not willing to wait. Quite naturally, he was all keyed up to start on his flight to the North Pole, and he chafed at the thought of being delayed even for a few days. He therefore undertook to land his two aëroplanes from the *Chantier's* anchorage. He resorted to a daring expedient, which was executed with amazing speed and skill. Under his direction a pontoon was constructed by lashing four small boats together. Boards were laid across their gunwales to make a platform. The 'planes were lowered on to this deck and the pontoon was towed through the floating ice to the shore. It was a very risky business, but its success was as brillant as its conception.

Ignorant critics have tried to make the

public believe that our expedition purposely hampered Byrd's landing. Their theory is that we were jealous of the prospect that he would beat us to the pole. The reader by now must be fully aware that the pole was not our objective. Byrd himself was aware of that fact, for in New York, six weeks earlier, I had talked personally with him and had said to him: "We do not count you as a competitor, as we are not interested in the pole." Our objective was Alaska, and the pole was only an interesting incident. Byrd's whole idea was something entirely different. His sole purpose in his flight was to reach the pole and return without landing. Never at any stage of the proceedings has there been or is there any rivalry or jealousy between us.

Nobile, however, when he arrived a few days later with the *Norge*, took a different attitude. This was not surprising in view of his previous efforts to persuade me to permit him to turn back once the *Norge* reached the pole. Evidently this notion, so alien to my own intention on the expedition, still persisted in his mind. As soon as he had got the *Norge* into the hangar after his arrival and had heard that Byrd had landed his planes on the beach and was concluding his preparations for his flight, Nobile came to me and said:

"The *Norge* can be ready in three days."

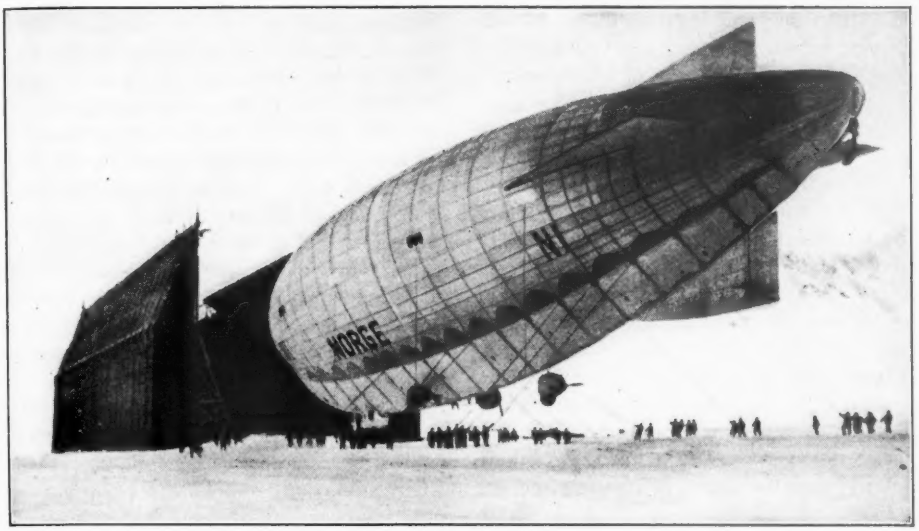
I instantly responded: "Nothing doing. We are not running a race with Byrd to the North Pole. I do not care in the slightest whether he reaches it ahead of us or not. Our job is to cross the Arctic Ocean."

Commander Byrd cannot be too highly praised for his flight. He and his pilot, Floyd Bennett, deserve the highest admiration for their courage—few more hazardous ventures have ever been undertaken in history. To say nothing of the practical certainty of death if they had been forced to land and had been unable to rise again, the dangers of the flight were multiplied by the difficulties involved in making accurate observations of position in those regions. The magnetic compass is there very sluggish, and even if it were accurate in those latitudes, still the difficulties of making accurate observations in a plane traveling a hundred miles an hour would have made the work of the navigator extremely difficult. If considered only as a feat of navigation, Commander Byrd's exploit is one of the most remarkable on record.

On the evening of May 10th, everything was ready for the *Norge* to start. We had a conference that evening and agreed to leave at one o'clock in the morning. I was awakened about midnight by the watchman, who explained that a wind had sprung up and that our start would be delayed. I went back to sleep and was wakened again at six o'clock by a man who brought the message that everything now was all right. I got up and had breakfast and went up to the hangar. Word was brought us that, on account of the wind and the consequent difficulty in manœuvring the dirigible, we should bring with us as little as possible of personal effects. Ellsworth and I, therefore, went up to the hangar with only what we had on.

Imagine our astonishment to find everything about the airship in confusion. Men were running hither and yon, carrying packages aboard the gondolas. Nobile was standing off to one side, apparently in a state of equal confusion. When we came up, he explained to us that the sun had now risen so far that it had touched the top of the gas bag, the gas had expanded, and he did not venture to start. Ellsworth and I went on up to the hangar. Suddenly, some one came running up, calling: "We're off!" Puzzled to know the reason for this sudden change of front, but assuming, of course, that it had some reason, Ellsworth and I went aboard, and in a few moments we were in the air.

Later, we learned what had happened. Riiser-Larsen had come up to Nobile after we had left him, and found Nobile in such a state of nervous excitement as to be incapable of action. Nobile had cried out that he would not be responsible for what would happen if the *Norge* were brought out of the hangar into the wind. Riiser-Larsen made a contemptuous retort that the little breeze then blowing was a matter of no moment. Thereupon Nobile threw up his hands and exclaimed:



THE "NORGE" AND ITS HANGAR AT KINGS BAY

Since Peary had taken the North Pole by way of dog sledge, Amundsen planned the crossing of the north polar sea by air as a crowning achievement for his life of hazardous adventure.

"If you will take the responsibility, then take her out of the hangar."

Riiser-Larsen had thereupon accepted the responsibility, and with the assistance of Lieutenant Hover the final swift preparations were made under his orders. The moving pictures, taken of these last moments when the *Norge* was brought out of the hangar and we took the air, show Riiser-Larsen giving the orders and Nobile standing fatuously to one side, doing nothing. Here again Nobile demonstrated his conduct in an emergency. We were to have yet further demonstrations on the flight.

The *Norge* took the air on her epoch-making journey from Spitzbergen at ten o'clock in the morning (local time) on May 11, 1926. Forty-two hours later, we sighed Point Barrow on the north coast of Alaska. My dream of years had come true! My career as an explorer had been crowned with success in practically the last of the great possible achievements. We had crossed the Arctic Ocean from continent to continent.

The distance traveled by the *Norge* had been estimated at 3,391 miles. The distance in a straight line from Spitzbergen to Point Barrow is about 2,200 miles; from there to Teller about 1,000 miles more. Too high praise cannot be given Riiser-Larsen, who did all the work of navigation. So skillfully did he chart our course that, after this prodigiously long flight—longer than an air route from New York to San Diego—over unbroken fields of unexplored ice, with not a single landmark for a guide, we sighted Point Barrow with a total deviation from our objective of not more than ten miles.

This is not all the credit that belongs to Riiser-Larsen. Three times on the flight his presence of mind saved us from disasters into which Nobile's nervousness and utter lack of self-control threatened to plunge us. These incidents belong with those I have mentioned before, as the kind of thing men try to forget and not to mention when the trials of an expedition are over. I should not discuss them now were it not that Nobile has brazenly tried to claim, not only the honors of a pilot, which was his only function, but also major honors of the expedition itself. Otherwise, I should not take the trouble to show, by the following incidents, that he was not equal even to the task of pilot.

To make these incidents clear to the reader, I must explain something of the

construction and management of the *Norge*. Beneath her semi-rigid gas bag were suspended four gondolas, of which one was at the rear and two were on the sides. These contained the motors which drove the propellers. The larger gondola was farther forward. It was an enclosed structure, built like a small house and divided by partitions into three tiny rooms. The room farthest forward, because of the clear view ahead, was the pilot house. Here was the steering wheel, controlling our direction to the right or left as we sped along. Here also was the wheel that controlled other rudders which preserved our horizontal position, or which tilted the airship upward or downward. And here finally were the levers controlling the gas valves. By manipulating these so as to release the gas from one chamber into another, or from all simultaneously, the pilot was able to control the equilibrium of the ship and its elevation. This last—the management of the gas bags—was Nobile's sole function as pilot.

Directly aft of this pilot room was a tiny room for the navigator and the rest of the crew. Here were instruments for taking observations, maps, and a table on which to work out calculations. This was Riiser-Larsen's and the whole crew's workshop. At best this space was crowded, for besides Nobile, Ellsworth, Riiser-Larsen, and myself, six members of the crew occupied this forward gondola. Six mechanics occupied the three smaller gondolas that housed the motors.

Nobile and I spent most of our time in the pilot's cabin. Naturally, I had the easiest task of all on board. The others did the work of keeping the ship going, and going to the right objective. My function was solely that of the explorer, watching the terrain below, studying its geographical character, and especially keeping an alert eye out for any signs of a possible Arctic continent.

Ellsworth was occupied a good part of the time taking observations to measure the atmospheric electricity of the regions through which we passed. These observations were made at the request of the Curie Institute of Paris, by means of a special machine lent us for the purpose. Ellsworth's original intention, when the expedition was first planned, was to help Riiser-Larsen calculate the navigation of the ship. He had preceded me to Norway by a month to take special studies to perfect himself in the art of navigation, with which he was already familiar. But when we got to Spitzbergen and found the organization was all set up, Ellsworth was too large-spirited to interfere, and so devoted himself to his electrical observations and to such other useful things as he could find to do.

Naturally, Riiser-Larsen's whole time was not occupied by his calculations of our course. A good deal of his time was spent with Nobile and me in the pilot house, observing the instruments indicating our wind drift, and other technical devices that were related to his calculations. It was indeed fortunate for us all that Riiser-Larsen had to be a part of the time in the pilot house, as will appear when I now relate the three incidents alluded to above.

One of my comrades on the dash to the South Pole was also with me on the *Norge* flight. This was Oscar Wisting, one of the finest fellows that ever lived. Wisting was managing the vertical control in the pilot house—of course, under Nobile's supervision. Nobile asked Wisting to let him take the control so that he could get the "feel" of the balance of the ship. Wisting stood aside and Nobile took the control. Imagine my astonishment to see Nobile standing with his back to the nose of the ship while he turned the wheel around several times in a careless manner. The nose of the *Norge* responded and tilted downward toward the ice. As I was facing forward, I could see that we were getting closer and closer to the surface. I looked at Nobile and he seemed not to realize what was going on. He seemed, indeed, to be standing in a sort of daze. I said nothing. I should have said nothing if we had crashed, for I adhered throughout the voyage strictly to my status of commander and left the operation of the ship absolutely to Nobile as skipper, to whom, by the right of the sea and the right of the air, it belonged.

Riiser-Larsen, however, did not hold so strictly to the code. It was fortunate for us that he did not, else none of us would have come back to tell the tale. The ship was speeding swiftly toward the rough ice below us. Another moment, and we should be dashed to pieces. Riiser-Larsen sensed the danger. Nobile seemed insensible to it: he stood like a man in a trance. Riiser-Larsen sprang to the wheel himself, thrust Nobile roughly to one side, and himself spun the wheel around. So close was our call that we thrust our heads out of the cabin window to see if the rear motor could possibly clear the ice. Fortunately, it did, but it was a matter of inches.

Exactly this same incident happened a second time on the voyage, but with one variation. Again Riiser-Larsen saw us about to crash into the ice. This time he shouted a rough word of warning to Nobile to change our elevation. Nobile gave a start like a man coming out of a dream. Automatically, he obeyed Riiser-Larsen's command and whirled the wheel back a few revolutions. We barely cleared the ice as the *Norge*, responding to the rudder, rose again.

The third incident was this: Flying southward above the ice, the *Norge* ran into a heavy fog. This, of course, put us in an extremely dangerous position. Speeding along at fifty miles an hour, a slight downward deviation in the horizontal balance of our gas bag would be enough to send us headlong into the ice. Nobile at once did the only thing to do. He spun the wheel of the vertical control so as to point us upward in an effort to climb above the fog bank. He was in such nervous haste to do this, however, that he gave no thought to the gas pressure in the bag. We mounted swiftly to a high altitude. Suddenly Nobile "came to." We had reached a point so high as to reduce the atmospheric pressure on the outside of the gas bag to a point where the gas pressure inside threatened to burst the bag. Nobile now made a frantic effort to get the nose of the *Norge* pointed downward. The ship did not respond to the rudder. Then Nobile lost his head completely. With tears streaming down his face, and wringing his hands, he stood screaming: "Run fast to the bow! Run fast to the bow!" Three of our Norwegians dashed forward on the runway under the bag, and by their weight forced the *Norge's* nose downward.

Not even certain incidents of the passage over the actual North Pole could destroy the friendly atmosphere of the expedition, though Nobile's conduct there gave Ellsworth and me every ground for extreme irritation. Time and again, in the preparations for the flight, Nobile had insisted upon everybody keeping down to the barest minimum the amount of effects of whatever description that should be taken on board. He was forever harping on this subject. The reader will recall the selfish arrogance into which this mania led Nobile on the flight from Rome to Spitzbergen—how he refused to permit the Norwegians to wear their Arctic suits, while he and the other Italians appeared on board in comfortable fur coats. We were now, in crossing the North Pole, to discover further evidence of Nobile's callous disregard of the sensibilities of others.

Ellsworth and I had each, of course, brought a flag to be dropped overboard as we crossed the pole—Ellsworth the Stars and Stripes, and I the national flag of Norway. In keeping with Nobile's injunctions, we had each brought a little flag not much larger than a pocket handkerchief.

As we crossed the Pole, we threw these overboard and gave a cheer for our countries. Imagine our astonishment to see Nobile dropping overside not one, but armfuls, of flags. For a few moments the *Norge* looked like a circus wagon of the skies, with great banners of every shape and hue fluttering down around her. Nobile produced one really huge Italian flag. It was so large he had difficulty in getting it out of the cabin window. There the wind struck it and it stuck to the side of the gondola. Before he could disengage it we must have been five miles beyond the Pole. When it finally flew free, it hurtled back to the rear gondola and there for an instant it seemed that it would become entangled with the propeller and give us serious trouble. At length it fluttered free and sank swiftly to the surface of the ice below us.

With the landing at Teller, the expedition, as such, was at an end. Ellsworth and I went to Nome, remaining for three weeks altogether. As soon as we arrived, we got off, by cable to *The New York Times*, the first part of our story of the flight. Meanwhile, the wireless at Teller had got going, and Nobile began sending out press dispatches himself. This was in direct violation of all our past agreements and gave Ellsworth and myself such irritation that Ellsworth cabled the Aëro Club at Oslo to protest against Nobile's unauthorized literary ventures. Meanwhile, Nobile resumed his presumptuous attitude toward us. He sent a letter to Ellsworth by boat from Teller to Nome, marking it "confidential," in which he retailed to Ellsworth what he called his "many troubles." Among the "many troubles" that Nobile listed in his letter, he complained especially of the fact "that you and Amundsen are signing the *Times* articles without including my signature." Where in the world he got the idea that he had anything to do with the *Times* articles was a mystery to Ellsworth and me. We two had signed the contract with the *Times*, and Nobile, at no stage of the proceedings, had ever been considered in that connection.

On the other hand, Ellsworth and I had every reason to be irritated with Nobile for presuming to write anything at all for publication about the expedition. The only writing Nobile was authorized to do that we had ever heard anything about was the writing of a chapter on the technical aspects of the flight.

Ellsworth finally convinced Nobile that the sensible thing to do was to come over to the Log Hut and have a full discussion among the three of us with a view to clearing up all misunderstandings.

This conference ended with Nobile still dissatisfied. Some days later, he encountered Ellsworth in the telegraph office, and a second conference was arranged at the Log Hut. Nobile opened the discussion on this occasion with a very imperious manner. He demanded full recognition as one of the three commanders of the expedition, including in these brusque demands that his name appear with Ellsworth's and mine as cosigner of the articles for *The New York Times* and of the book about the expedition. I thereupon read to him the cables from the Aëro Club at Oslo addressed to Ellsworth, which clearly limited both his status as a member of the expedition and the extent of his privilege in writing about it.

Nobile thereupon burst into a tirade which revealed fully the schemes and ambitions which had been boiling in his mind from his first connection with the expedition. This emotional oration disclosed that he had from the very beginning harbored "illusions of greatness."

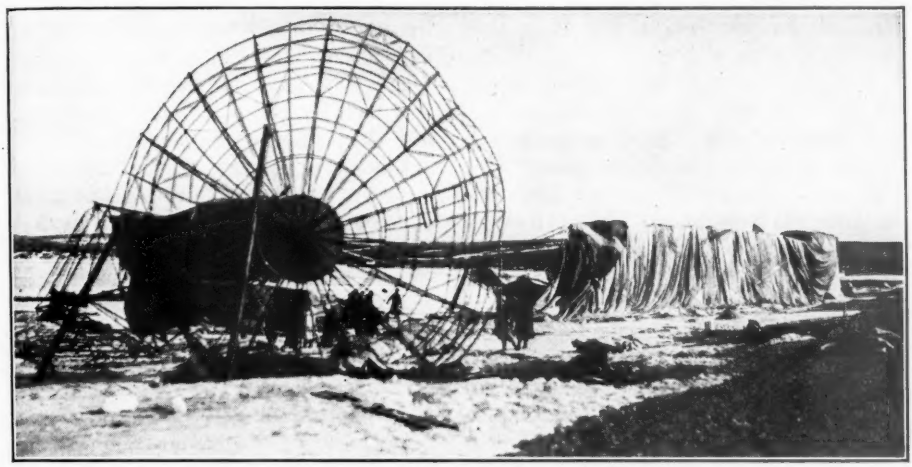
As Nobile's narration to Ellsworth and me proceeded, however, I lost all patience with his childish display of lack of common sense. When, in his peroration, he grandiloquently shouted, "I have given my life to this expedition—I had the whole responsibility of the flight," anger got the best of me. For this Italian, who six months before had had no more thought of Arctic exploration than he had of superseding Mussolini as the Chief of State, to be shouting this kind of presumptuous nonsense in my face, with my thirty years of labor and achievement in the polar regions, and to be claiming an equal share with us in the conception and execution of the transarctic flight, with his silly talk about giving his life to the expedition and having the whole responsibility of it—all this was too much for me to stomach. With furious indignation, I reminded him now in no uncertain tones of the pitiable spectacle he would have presented on the polar ice if the *Norge* had by chance been forced down, and pointed out how preposterous would have been his claims to effective leadership under those conditions. And in heated tones that carried finality I reminded him, for the last time, that Ellsworth and I were the leaders of the expedition, that we should never recognize his right to claim a major share in its achievement, and that we should prevent him, if we could, from writing anything about it except what his contract permitted him to write about the technical aspects of the flight.

Nobile took this stinging rebuke with becoming meekness. The swaggering officer who had entered the door a little earlier left it with a return to his more natural childish manner. His only response as he left was a hopeless shrug of the shoulders and a mumbled remark that he was "sick of the whole thing." And well he might be—the breaking of the bubble of one's own pretensions, however salutary, is never pleasant.

If Nobile got no balm for his wounded feelings from Ellsworth and me, who knew the facts about his pretensions, he did get it from the citizens of Nome, who did not know. In fact, so effectively did he spread the story of his polar achievement that when people in Nome gave a public banquet celebrating the *Norge* flight, Nobile was the guest of the evening and Ellsworth and I were not invited. I except from all criticisms of Nome a few of my friends of many years' standing, including the Lomen brothers, who are generally accepted as the leading citizens of Alaska, having done most of all its inhabitants for the permanent development of the territory, and being the leaders in the business life of Nome and the surrounding region. Their loyal friendship has followed me without wavering through all the years of our acquaintanceship, and I am their debtor many times over for kindnesses both personal and financial.

The general run of the people in Nome, however, acted like the masses everywhere—they were credulous of marvelous tales, easily moved to emotion, and eager to make a one-day sensation over the latest novelty in the way of popular heroes. Ellsworth and I were an old story—we had been there before—whereas Nobile was a novelty. He had, besides, the glamor of the Roman ovation about him. Naturally, I keenly felt the slight put upon Ellsworth, my comrades, and myself by this public demonstration which ignored us. It was the climax of a series of incidents of the same tenor, and I should be less than candid if I did not record it and express my feeling that the whole situation revealed bad taste and bad manners on the part of the people of Nome.

As our vessel approached Seattle, Ellsworth and I rallied each other upon the appearance we should present before the crowd which we understood was to meet us at the dock. We had brought no money with us from Spitzbergen, and in keeping with Nobile's constant injunctions about the minimum weight of luggage, we had brought no change of clothing with us. Consequently, in Nome, when we discarded our Arctic costumes, we had



DISMANTLING THE "NORGE" FOR SHIPMENT

Very slight resemblance to the majestic dirigible which crossed the Polar Sea from Spitzbergen is to be seen in this picture of its dismantling at Teller, Alaska.

bought and donned the only clothes available, and these were the apparel of the miner. Our rough suits, woollen shirts, and heavy shoes were appropriate enough on the streets of Nome in midwinter, but, however picturesque, they were hardly fitted to the formalities of an official civic reception in Seattle. Nevertheless, there was nothing to be done about it. We had the consolation of feeling that, at any rate, all the members of our party were in the same situation.

Imagine, then, our astonishment when, as the vessel drew up toward the pier, Nobile appeared from below apparelled in the most resplendent dress uniform of a colonel in the Italian Army! This was nothing less than double dealing. By constant admonitions on the subject of little baggage, which the rest of us had accepted in good faith, he had prevented us from bringing even decently presentable clothing on the expedition across the pole; and again, on the flight from Rome to Oslo, had caused actual physical suffering to the Norwegians who had been required to make the trip insufficiently clad. Nobile's selfish violation of his own admonitions in the matter of the flags put overboard at the North Pole had only caused us a slight amused irritation; but now it was revealed that he had secreted in the *Norge* on the flight across the Arctic Ocean—where, according to his own story, every needless pound was a menace to the very lives of us all—the bulk and weight of heavy military uniforms, not only for himself, but for two of his compatriots!

These thoughts, added to our irritation at his vulgar bad taste in appearing on this occasion in ostentatious contrast of appearance with his fellow members of the expedition, caused me to boil inwardly. My anger was increased when it became apparent that he had carefully calculated the spot at which the gangplank would be let down from the deck, and had stationed himself at a point beside it where he could thrust himself forward and seem to lead the expedition off the vessel. Notwithstanding my indignation and contempt, I made no effort to thwart him. Certainly, it was beneath my dignity to enter a competition for the moment's precedence with this strutting upstart.

One of the ship's officers, however, also, sensed this intended impudence of Nobile's, and, with the true seaman's punctiliousness regarding the proprieties, quietly but very firmly placed himself in a position to block Nobile's dash for the gangplank, and then bowed to me and Ellsworth to lead the procession to the landing.

There a large crowd was gathered to receive us, including official representatives of the city government. A charming little girl, seven or eight years of age, dressed in a gay frock, stepped forward with a bouquet of flowers, in a pretty little ceremony of greeting. Here, in miniature, Nobile had the triumph for which his uniform was a part of the planning. The little girl did the most natural thing in the world: Seeing before her three strange men, and realizing only that the occasion was the most important in her young life, and seeing also that two of the men were roughly dressed like workmen, while the third was resplendent in a military uniform, there could be but one answer in her mind to the question of relative importance. Naturally, the military uniform got the flowers!

In Seattle, Italian propaganda had created a situation which caused me sharp disappointment. The Italian Consul had evidently received instructions from the Italian Government to do everything possible to make Nobile's return a triumph. In this task, his efforts were ably seconded by the local Italian Fascisti. By their volubility and patriotic fervor, they had succeeded in creating the impression in Seattle, before our arrival, that the *Norge* flight was largely an Italian undertaking, and that Nobile was, with us, the chief in command of it.

Careful preparation—to that Amundsen ascribes his success as an explorer. In his final article, next month, he describes his care and pains in assembling the tools of an explorer.

Can We Tame the Mississippi?

We Face a Bigger Job Than Building the Panama Canal

WILL IRWIN

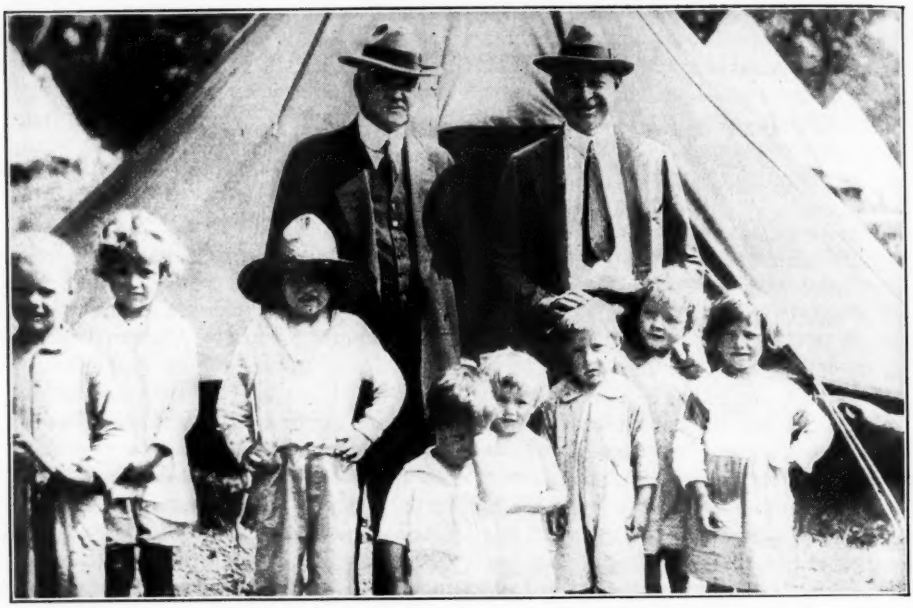
Hundreds of millions in property is destroyed whenever the Mississippi runs wild in flood season, and after the catastrophe of this year the nation faces one of its greatest problems—a problem of politics as well as of engineering. In this article Mr. Irwin discusses the three ways of preventing recurrence of this great disaster. He has interviewed the foremost authorities on the subject.

EVERY YEAR since the Ice Age the mighty but flabby Mississippi River has absorbed the spring overflow from its own basin and from its mountain-born tributaries to east and west, has risen and has overflowed its indefinite banks. In the days of its freedom, one could have counted on this spring overflow as definitely as on that of the straighter and better-behaved Nile. About its bed, as though to accommodate its caprices, lay a basin of thirty thousand square miles, only a few feet above low water level. Across this area the spring freshets rolled now here now there, according to which tributary region had that year the greatest rainfall.

One or another of the smaller basins which composed the great basin probably ran full every April or May. Some filled up only in exceptional years. Life along the Mississippi accommodated itself to these conditions. The water spilled gently over the alluvial bank. The deer and bear and bison, the squirrels and raccoons and turkeys, moved away from the slowly advancing flood. When the age of man arrived, the Indians pulled up their tepees and trekked; or, in the northern area, moved goods and supplies to the tumuli of the mound-builders, where they waited, high and dry, for the waters to subside. White farmers, in the late flood, fled to the same refuge; perhaps the mound-builders had in

THE FULTON SLIDE AT VICKSBURG, MISSISSIPPI

The immensity of the task which confronted the workers who fought to hold back the rising flood of the Mississippi is apparent in pictures such as this, showing the vast sandbag buttressing necessary to withstand the long siege by the Mississippi. Often the labor of weeks was swept away in a single day.



MAKING AN INSPECTION OF THE NATCHEZ, LOUISIANA, RELIEF CAMP

The magnitude of the task of flood relief and rehabilitation which President Coolidge assigned to Secretary Hoover has not been generally appreciated because of the latter's genius for getting things done without a blare of publicity. Secretary Hoover (left) and Secretary Davis are shown above on a visit to one of the many Red Cross camps established for flood refugees.

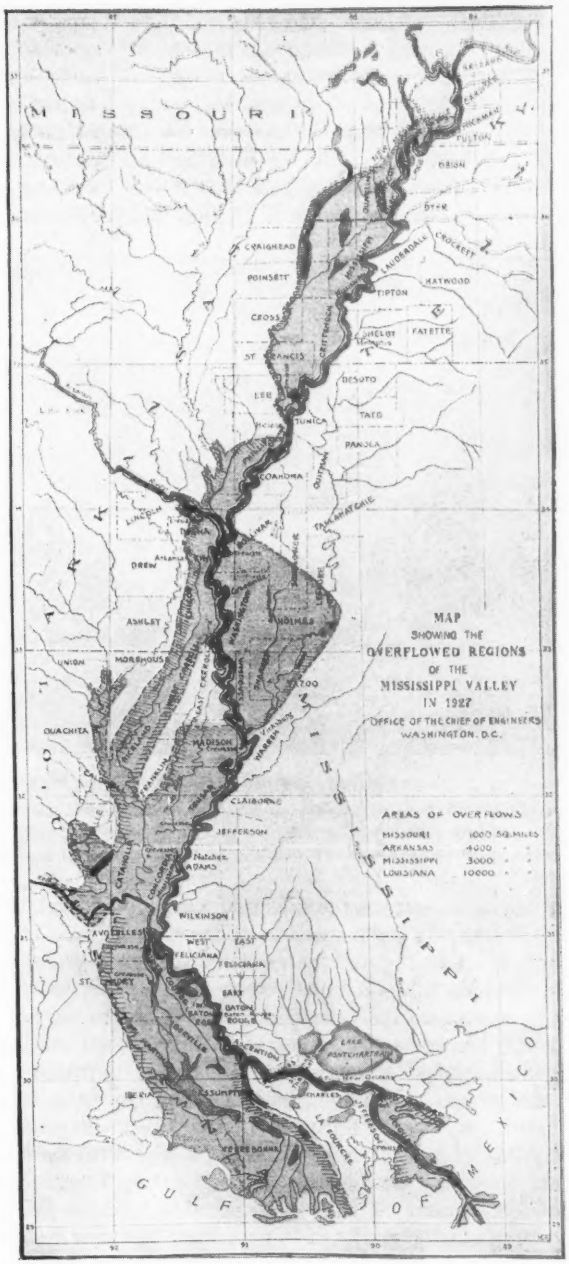
mind uses practical as well as ceremonial!

But once in every few centuries there must have come a coincidence of the weather. Melting snows and spring rains of an exceptionally wet winter and spring saturated the great interior valley until its soil shed new water like a tarred roof. With sinister rhythm the northern tributaries rose first, starting down the main channel below the mouth of the Missouri a crest of high water. As this rolled slowly but inexorably southward, it passed the mouth of each succeeding tributary just when that river had reached its maximum height. Down this crest followed the buzzards, preying on the carcasses of small animals drowned by the overflow; and above them, buzzard-like, hovered torrential rain-clouds, pouring their five or ten inches of water a day. All the forces of nature worked together to swell the Mississippi. In ordinary years—speaking at random—the big river and its most affluent tributaries may have flooded eight thousand square miles of its basin; in exceptional years perhaps ten or twelve thousand square miles. But in the years of this meteorological coincidence, the river submerged its whole basis of thirty thousand square miles to a depth of from one foot to forty feet. Though we have no records of such a rise, it must have happened again and again. We need no proof from records. The mathematical probability is so strong as to kill doubt. And indeed, very imperfect data surviving from that semi-civilized stage of western development indicate that one or two floods in the eighteenth century may have reached this sinister height.

At any rate, just this coincidence of weather happened again in this year of 1927, when the Mississippi basin was no longer a romantic wilderness but very marrow to the backbone of American agriculture. Uncontrolled, the freshet of 1927 would have submerged the whole area. The system of flood-protection which the Federal Government and the inhabitants of the valley have been building for a hundred years saved one third of the area. But protection broke down in some of the

most vital places. Over eighteen thousand square miles of prosperous towns and super-fertile farmland the river had its way, as certainly and inexorably in 1927 A. D. as in 927 A. D. Accurate statistics of the disaster are only beginning to come in. But we know enough to say with certainty that this exceeds, for property loss and disturbance of business, any other American calamity except our two greatest wars. In one respect alone does disaster lack of completeness. The valley escaped with slight loss of life, owing mainly to swift and certain work on the part of that master-organizer, Herbert Hoover.

As the Mississippi littoral wrings out its clothes and drags its corroded farm-machinery from the muck, it realizes that we have been only trifling with the river all these years. In normal seasons the existing system of levees suffices. In the years of high flood which recur every decade or so—as in 1912 and 1922—it has worked only imperfectly. In the unprecedented flood of 1927, it proved tissue-paper. Nothing except a new dispensation which gives assurance of absolute safety will satisfy the Mississippi littoral or, for that matter, the American people as a whole. As I write—with the flood waters still tearing southward over the cane fields of southern Louisiana—the Mississippi Valley is dividing itself into factions and holding perfervid debate. River-doctors, both quack and regular, are gathering followers. Politicians are going off half-cocked. While the crest was still a hundred miles up-



FLOODED AREAS OF THE MISSISSIPPI VALLEY

Official estimates of the War Department place the areas flooded by the rampant Mississippi in Missouri, Arkansas, Louisiana, and Mississippi at 18,600 square miles, a total nearly as large as Maryland and New Jersey combined. So vast and extended is the area affected that the problem of future safeguards has become national rather than local in character. It is apparent that centralized Federal control will be necessary if the entire region is to receive effective protection.

river, New Orleans had instituted a spillway hearing; Mayor Thompson of Chicago had summoned a river conference at Chicago at which the doctors of all schools and the special pleaders for all affected sections might air their views; United States Senators had demanded an extra session of Congress to solve the problem—in spite of the fact that neither the Senate, the public, nor even the river engineers have as yet the complete data upon which solution must rest.

I, who know the Mississippi only as a casual tourist and a spectator of the flood in its last and most violent stages, would myself be going off half-cocked if I wrote on my own authority concerning this problem of the Mississippi. But in the course of my wanderings through the flooded country, I had exceptional opportunity to consult expert opinion. I talked with river engineers who have struggled for twenty years with the mysterious Mississippi; with chief engineers of the mid-western railroads who must always take the river into their calculations; with hydraulic engineers from the East whom scientific curiosity or some special mission had drawn to the disturbed area. What follows I offer not as a solution of the Mississippi River problem but merely as a statement of what that problem is. That, I think, has its importance; half of the people who are editorializing or lecturing on the Mississippi question do not know what they are talking about.

Competent engineering authority, then, offers three possible solutions, and only three, of the problem of Mississippi floods: *First*, the present levee system, improved by raising the banks and widening the distance between them. *Second*, "spillways" on the lower river—channels to the Gulf created or designated to carry away excess water whenever the flood level becomes dangerously high. *Third*, gigantic reserve reservoirs to store the excess waters until the flood period has passed. This solution may properly be divided under two heads: reservoirs in the upper waters of the tributaries, and reservoirs in the lowlands, relieving the main stream.

A DISEASE OF LEVEES: SAND BOILS

A serious menace in areas protected by their levees were the "sand boils," which are caused by water seepage under pressure popping out inland. Stacks of sandbags, as at Ferriday, Louisiana, were used to prevent a spread of the water and also to set up a counter-pressure basin.

First, higher and wider-spaced levees. This is the pet solution of the Army engineers. Since they are the great experts on the Mississippi, their opinion merits special consideration. On paper, it seems the simplest plan of all. You have

been running water down a 2 x 4 pipe. Suddenly an accident pours into its head an unexpected volume. The excess flow runs over the outside or creates a pressure which bursts your pipe at its curves and weak points. Very well; replace your 2 x 4 gauge with 3 x 6 or 4 x 8. That is the levee argument reduced to its lowest theoretical terms. But the practical terms are a great deal more complicated.

BATON ROUGE PREPARING FOR THE FLOOD CREST

Levees, which are simply extended earth mounds, cannot be expected to withstand the protracted pressure of extreme flood stages without heavy reënforcement. It is often necessary to build sandbag bulwarks on both slopes of a levee, as shown in the railway yards of Baton Rouge, Louisiana's capital.

In tackling the problem of Mississippi floods, the Army engineers inherited three generations of hit-and-miss work. The original settlers found a piece of bottom land fertilized for æons by river silt, staked their homesteads, and began raising bonanza crops. Every few years a wet spring overflowed their basin and drowned them out. To abate this nuisance, the community or the county built a dike which the imposed necessity of an exceptional flood raised in time to a levee. These protective banks were laid solely with an eye to local needs; reclamation, not river control, was the guiding principle. The builders took little scientific account of the river's natural course. In many places these "reclamation" levees, set too close together on opposite banks, constricted the flood waters. When you use an open hose to wash your car, the water emerges with a gentle flow. But when you put on the nozzle to water the lawn, it gushes and spurts. Just that began to happen to the Mississippi. Its overflows, in prehistoric times as gentle as those of the Nile, now became torrential, irresistible. Therefore, more and more levees at lower points; a broken chain of them all the way to the Gulf. In years of ordinary high waters, generally they served; in the periodic flood seasons some always went down, inundating one or another of those basins which fringe the river in the pattern of currants on their stem.

So it went on, decade after decade. In the '70's, the great Eads converted the Army engineers to the levee theory of river control. From then on through half a century they worked, as intelligently as circumstances permitted, to confine the Mississippi and the lower stretches of its tributaries in true courses and behind banks. They carried a double handicap—pork barrel appropriations from the Federal Government, which specified work in one district when the imminent danger might lie in another quarter; and indiffer-

ence or political quarrels on the part of river communities. But they made steady progress, rendering each flood, in proportion to its volume, a little less devastating than the last. After all, their system, imperfect as it proved in the great crisis, prevented in 1927 one third of the devastation which an unconfined river would have effected.

After the flood of 1922, the Federal Government took hold of the problem with considerable energy. An act of Congress gave the Mississippi River Commission, whose court of last resort remained still the Army engineers, virtually a free hand. For every dollar an abutting district put into levee improvement, the Federal Government agreed to give two dollars. Now, the engineers could perfect a general plan involving standard levees, high and strong enough to confine any known flow of water on the Mississippi and the lower reaches of its tributaries. Construction had proceeded busily in the intervening four years. But even before the flood of this spring the system had begun to show one flaw. A chain is no stronger than its weakest link. There were backward or financially embarrassed districts where inhabitants and authorities refused to put up for levee-work. The Army engineers knew in advance that these would be danger-points in years of exceptionally high water-level. Ever since they scented this emergency they have been using their discretionary powers to strengthen these weak links. Sometimes they won; more often they lost. And usually a break in the weak levee submerged not only its own district, which was responsible, but five or six surrounding districts which boasted that "Our levees held."

At best, the revised plans of the commission, however, drawn after Congress initiated the new deal, never envisaged such a flood as this. The crest ran high enough to overtop the levees, in some places by as much as three or four feet. A levee is only a dirt bank; soon after such a torrent overflows its crest, it melts away. The commission adopted emergency measures. Atop every threatened levee they built three, four, or five feet of sandbags, buttressed by a stout plank wall. Half of the violent battle to save the levees has consisted in filling, transporting, and piling sandbags. When I left Baton Rouge, the yellow water was lapping near the grassy top of the old levee—and the crest had not yet reached us. After that arrived, probably only the new barricade—resembling oddly a firing-trench of the war—would save from violent inundation the railroad yards, the factories, the homes of the lower city. Again and again in ticklish spots along the main river I saw the water-level impinging on the sandbags.

Not only this; the force of the current and the soaking of the torrential rains tended to weaken the levees. The "margin of safety" which their constructors allowed could never withstand such a cosmic strain. Under the persistent hammering of the mighty currents, they developed unsuspected flaws. For several days, the fight to save Morganza levee filled the newspapers. This is a most important point in the fortress erected by the Army engineers against the public enemy—flood. Its breakage means inundation for the eastern and richer half of the important "Louisiana Sugar Bowl." And lying at a bend of the river, it takes the force of the current head-on. So they had built like a rock of Gibraltar on a base three hundred feet wide. Here as elsewhere the levee proved too low to hold this unprecedented flood. Hundreds of men, working night and day, piled up sandbags to raise its level. Three times the river got ahead of them and overflowed the old top; by heroic work they closed the gaps just in time. Not only that; the banks kept developing "blisters" and "sand boils," those sinister springs and spouts of dirty water which indicate that the river is eating through the foundations. Constant vigilance and frantic, heroic work stopped these breaks and saved Morganza by a hair's breadth. But as I saw it in the last days of the fight, it seemed saturated, insecure, gigantically frail.

Morganza lies on the western bank. A few miles down the opposite side, a whole section of levee started to slide eastward. Had this gone its course, the break would

UNPRECEDENTED HIGH WATER AT JUDSONIA, ARKANSAS

The parallel lines of trees mark the normal course of the Red River. It is evident from the area overflowed by water that levees near the banks could never have contained the flood volume. Some of the experts are in favor of moving the levees far back from their present position, the people residing within their limits to be prepared for evacuation during extreme flood stages.

have inundated an important basin. The engineer in charge acted with instant intelligence. While part of his force plugged the cracks, he set the rest to building a cofferdam which held the levee in place.

In these two cases man won the fight against nature. Here is a sensational instance of defeat. Under the western bank of the Atchafalaya, a river which presents the same problems as the Mississippi, lies the little city of Melville. I say "under" with deliberation. At this point the Texas & Pacific Railroad crosses the river by a long steel bridge. It is necessary to keep the rails of this structure high above flood-water. Therefore the railroad, cooperating with the authorities, had raised the levee above Melville to a height of thirty-five or forty feet. This bank was so strong, so notoriously well-constructed, that the engineers, fighting to buttress certain weak spots above and below, paid it but scant attention. Its top rose high above the flood waters; it showed no sign of blister or boil. But at 5:15 on the morning of May 21st, it broke—"All at once and without a single preliminary blister," said the sentinel who witnessed the break and alarmed the town. Some hundred yards of bank seemed to blow outward, spilling a thirty-foot waterfall on to the Negro cabins below it—and miraculously without loss of a single life.

That morning, I stood on the bank with a river engineer, watching Hoover's mosquito fleet as it took residents from second-story windows. "We'd been walking over a hollow shell for days," he said. "From the way it behaved, it must have been rotten with water inside. But it didn't give a single sign." An automobile engine will not last long if you run it continuously with an open throttle. It wasn't made to stand such a strain as that. No more were these levees made to stand two months' of pounding from the Mississippi on one of its cosmic rampages.

But it's all a matter of hydraulics and mathematics, say one group of engineers. Raise the levees higher and widen the space between them. As you sail down the Mississippi nowadays, looking level at the roofs and treetops of the settlements under the banks, it strikes you not so much as a waterway as a great elevated trough. Simply enlarge the calibre of the trough.

So, not only will you lessen pressure and insure against overflow, but by giving the current room you will shorten the flood period and correspondingly the period of strain on the banks. This does not mean that every levee need be shifted. Some opposite levee-systems lie already far enough apart. It is all a question of how has dared estimate the total; no one can possibly estimate it until the engineers draw their plans. But it will probably cost as much as the whole existing levee system to date. Against that, however, we may check off the recurrent devastation of the great overflows.

Given a free hand with this plan, the engineers hope to complete their task of laying the levee system with a view to flood control instead of reclamation—of putting the river in its natural channel. That last point seems less important to the layman than it does to the expert. When news came of the break at Big Bend, I consulted the map with an Army engineer. The river at this point makes a gigantic pear-shaped loop. The dullest eye could see that the northern root of this loop, taking as it did a right-angled turn, would receive the full force of the waters. And precisely at this point the levees gave way.

TEMPORARY MEASURES THAT FAILED

Planking hastily erected on the levee at Cottonport, Louisiana, would have saved the countryside from inundation if the flood had been of short duration. With the sustained volume of this spring it was but a matter of time before the levee softened to mud. One of the first important breaks occurred at this point.

many cubic feet of water will pass a given point every second. However, this will be a gigantic task, comparable only to construction of the Panama Canal. Working in periods of low water, armies of men and regiments of machines will scoop up the existing levees, carry the material a quarter of a mile, a half-mile, or a mile backward; reconstruct and enlarge them. This applies of course not only to the Mississippi proper, but to all its tributaries to the point where they emerge from the hill-country into the basin.

Intensive settlement along the Mississippi littoral introduces one complication unknown to the pioneer levee-builders. Towns, settlements, and valuable farms crowd the river-bank. Acquiring the land by eminent domain, moving back isolated houses, wharves, parts of towns, even factories, will prove very expensive. No one

"Well, now," I said with cheerful ignorance, "why not straighten the river at this point—cut out that loop altogether?" The engineer smiled a superior smile. "If you did that," he said, "you'd accelerate the flow until it became almost a rapid, and you'd cause serious trouble elsewhere.

The Engineering Corps has found that the river will make its own channel. If you cut an artificial channel straight as an arrow from Cairo to the Gulf, in twenty years the Mississippi would be back behind the old banks."

However, even this principle needs modification. In places, the whimsical old giant is constantly trying to change his course. Maintaining the channel, for both security and navigation, costs the Mississippi River Commission two thirds of its time and energy. Suddenly, at a point where it has been behaving with model regularity, the river begins to bore; a whirl of water eats into one side, builds up the other. The commission meets this by installing "mattresses"—linings of plaited willows, or, in extreme cases, of reenforced concrete. The river cannot absolutely be given its way. The best the engineers can do is to strike a mean average of its wanderings. The longer you talk to them, the more you realize that maintenance of channel is less a matter of exact science than of art.

So much for "levees only." Now for spillways.

As the flood-crest advanced south of Vicksburg, a rapid calculation of actualities and probabilities convinced the city authorities of New Orleans that their levees might not hold—probably would not hold. In a series of hurried conferences, they decided on emergency measures. A break in the levee system above or below the city would relieve the dangerous pressure on their own straining defenses. The state, by power of eminent domain, granted them the right to inundate farms and small villages, in order to save the Metropolis of the Gulf. This was drastic but intelligent. New Orleans represents one third of Louisiana's assessed valuation. The city had two alternatives. They could cut the levees at Waggaman, some ten or fifteen miles up-river, thus diverting part of the flood before it reached their city; or they could cut at Poydras, a few miles down-river, thus accelerating the flow. The first plan was the surer but also the more expensive. A break at Waggaman would send water some forty miles to the Gulf, over a region of fine farms and flourishing small towns. The damage—and New Orleans had agreed to foot the bill—might amount to $25,000,000. The Poydras break would

THE POYDRAS LEVEE WHICH WAS BLASTED

This strong levee might have held the Mississippi flood crest had not the safety of New Orleans necessitated its cutting. The value of roads paralleling the levees was clearly demonstrated, facilitating the movement of people, animals, and personal property to these concentration points.

involve only a few miles of comparatively unsettled country and cost in damages perhaps not more than three millions. New Orleans, at the end of a hectic night conference, determined to try the lesser measure first; they blew a crevasse in the Poydras levee. It worked as calculated. The water-mark on the New Orleans levees began falling. But the crest was still far up-stream; New Orleans held Waggaman in reserve.

It is my guess that circumstances would have forced this last desperate measure but for one fact. A hundred miles northwestward as the crow flies, the Big Bend and Bayou des Glaises levees gave way. For volume of water involved, this was the biggest break in the whole flood. The torrent rolled down the west side of the Atchafalaya Valley, a hundred miles to the Gulf, and inundated half of the famous Louisiana Sugar Bowl, unhoming more than one hundred thousand people. The crest flattened out. New Orleans was saved. In the first crisis, man made the spillway; in the second and more important, nature.

Quite humanly, New Orleans went mad over this solution of the Mississippi problem. It stands almost to a man for permanent spillways—floodgates in the river bank and a rough system of new dikes to protect the regions down which, in flood years, overflow must run. Concerning the location of these emergency outlets, there is considerable diversity of opinion. Some speak of Poydras, some of Waggaman; one scheme, more elaborate, would put the floodgate higher up and on the eastern bank, so draining off the excess waters through Lake Ponchartrain. The most daring plan of all proposes the Atchafalaya River as the great permanent spillway. That scheme merits fuller discussion.

Glance at the map of the United States. Notice that the great river, after the Missouri joins it, runs almost straight southward until it reaches the point where the southwestern corner of Mississippi (meaning of course the state!) cuts into Louisiana. There, it turns at an angle of about forty-five degrees and runs southeastward to its mouth below New Orleans. But in past geologic eyes, it did not take this turn. It ran straight southward to the Gulf, emptying near the present site of Morgan City. Now, the Atchafalaya, dwelling in the abandoned nest of its great neighbor, rises from the bayous and swamps just below this southeasternly turn of the Mississippi. As it nears the coast, it widens into a string of lakes. Just above its sources runs the Red River of the South, a most fickle and turbulent tributary. This joins the Father of Waters at that same great turn.

This has always been a ticklish corner; here, the big river's caprices are at a maximum. Just below the turn to southward lies a curved bayou of sluggish water called Old River. Even after the white man came, that was part of the Mississippi channel. Then the river cut a new course, some four or five miles northward. The engineers, understanding the danger of this corner, long ago buttressed it with high levees and reserve dikes. Nowhere during the crisis of 1927 did they fight harder to hold the fort. But the river had its will. The Atchafalaya proper might have served as a natural spillway, leading the water from the Big Bend break harmlessly to the Gulf, but for the fact that it ran already bankfull and was beginning to burst its levees. For the Red had broken loose, discharging its floods into the Atchafalaya. When the Mississippi rammed its way through the Big Bend levees, it found its vent in the thirty-mile strip of farms and cane plantations to westward. The river has behaved strangely at this point; there is some scientific reason for believing that it is trying to resume the old course, leaving New Orleans a harbor without water! That, of course, must not happen.

This most ambitious of the spillway plans envisages a stout floodgate at the ticklish corner, and rebuilding of the Atchafalaya levees to give that river more capacity. Before it burst its own levees, the Atchafalaya was running 400,000 cubic feet of water per second; the Mississippi at crest of the flood ran probably 1,800,000 foot-seconds. Double the capacity of the Atchafalaya, and you may carry away enough water to secure against

inundation—even in such a flood as this of 1927—not only New Orleans but those other important communities strung along one hundred and fifty miles of the lower Mississippi. Moreover, by accelerating flow this vent would relieve pressure for some distance above the floodgates. The benevolent influence of the Atchafalaya spillway might extend as far north as Vicksburg, or possibly a little beyond.

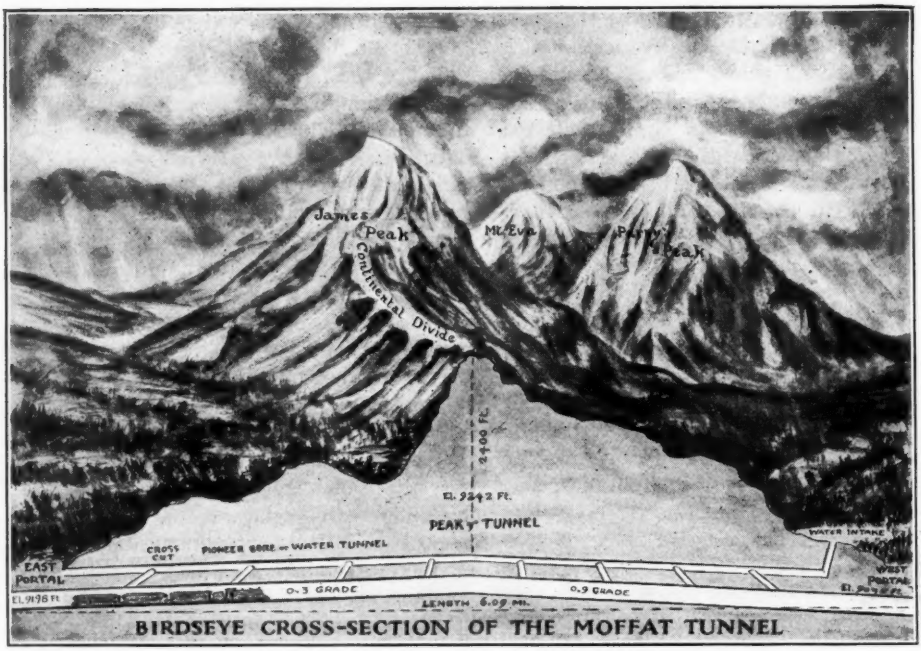
As far north as Vicksburg—and there you have the limit of the spillway system. It would probably give security to Louisiana and the southern part of Mississippi. It would do nothing for northern Mississippi, for Arkansas, Tennessee, Missouri, Kentucky, or Illinois. For them, science knows only two plans of relief: higher and wider-spaced levees or reserve reservoirs.

The proposal to impound by reservoir the upper waters of the tributaries, and to use the dams of these reservoirs for electric power, has occupied much valuable space in certain newspapers. No engineer to whom I talked took much stock in this idea. It has two inherent flaws. The great flood of 1927 originated not in the mountains but in the lower plains-country. "You could have cut off last November every tributary river above the one-thousand-foot level," said one of them, "and it would have made no perceptible difference." As for electric power, a reservoir designed for flood control must be kept dry in normal periods that it may be filled in seasons of stress; and a dry reservoir generates no current.

But reservoirs along the main river—that is another matter. We might set off as reserve reservoirs certain of those basins which fringe the river like currants on a stem. Floodgates would regulate the intake and outgo; and levees or dykes might increase the capacity of the basin. This would not involve running the inhabitants permanently out of the area; it would, however, involve new terms of life. Towns would necessarily have to be moved into the highlands. The farmers could go on as usual during, say, seven years out of eight. On the eighth, the flood year, the authorities would give them due notice of evacuation. Then they would move their families, their flocks, their agricultural machinery, and their household goods to highland camps, where they would await the subsidence of the waters.

Whether this reserve reservoir plan be sound or unsound, we shall not know until the Mississippi River Commission and the Weather Bureau finish collating the data which they have gathered so methodically since the great flood began. Only then will a sound engineer say whether these reserve reservoirs could draw off enough water from the crest to afford relative security. In fact, positive opinion on all proposals for river control must await the preliminary report of the Mississippi River Commission. Data as complex as this cannot be collected, assembled, and interpreted in a day. Working at top speed, the commission will scarcely finish its report before the regular session of Congress in December. A special session this summer might have served to speed up the work of rehabilitation. But it presented always the danger of hasty or demagogic decisions, based on incomplete information.

It seems likely that even before these lines see print, President Coolidge will create a larger commission to weigh the problem of control. Its backbone, doubtless, will be the Army engineers. When all is said and done, they are the only men who really know the Mississippi. But we need also great outsiders—engineers and industrial men with the breadth and imagination which experts sometimes lack. Finally, the ideal commission must include a few men of statesmanlike quality—politicians in the higher sense. The merely mechanical problem of controlling the great river seems not insuperable. But when the engineers have drawn up a sound and workable plan, there comes the more perplexing problem of making Congress and the public accept it. That current is full of shoals—selfish local interests, the mischievous machinations of demagogues, conflicts between states' rights and Federal control, plain folly. If we fail after this hard lesson to render the Mississippi lowlands safe habitations for man, the cause of failure will doubtless be not technical but political.



BIRDSEYE CROSS-SECTION OF THE MOFFAT TUNNEL

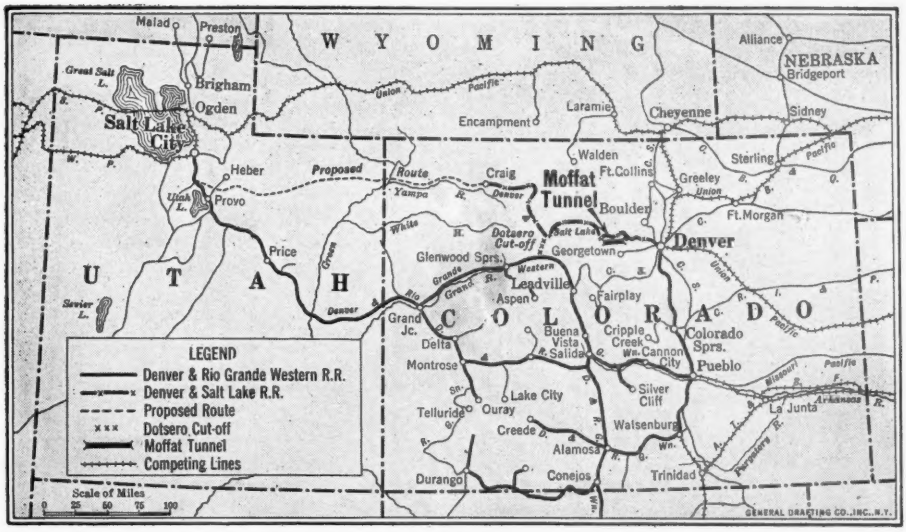
Colorado Tears Down Her Mountains

The State's Railroad Tunnel Demolishes the Rockies

ARTHUR CHAPMAN

Colorado is now completing the greatest railroad enterprise ever started by an American commonwealth, and the people of the state will soon own the longest railroad tunnel on the American continent and the sixth longest in the world. The ultimate effects of this new six-mile bore through the backbone of the Rockies are, to put Denver on a transcontinental railroad, to develop the rich northwestern corner of the state, and to cut the distance between Denver and Salt Lake City—in a word, to tear down the barriers of the Rockies. The water tunnel was "holed through" last February and the main tunnel will be completed soon.

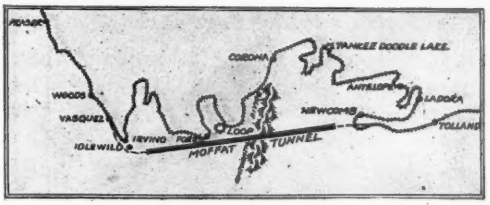
LIEUTENANT ZEBULON M. PIKE, who explored the headwaters of the Arkansas when Lewis and Clark were returning from their fruitful quest along the Missouri and Columbia, sighted Pike's Peak swimming "like a great blue cloud" on the horizon. He was amazed to find that this mountain was only the outstanding sentinel of the main range of the Rocky Mountains. The size of this wall of granite, formed by the Great Divide, appalled later explorers. Major Long, whose name is given to Long's Peak, thought the continental range would mark the farthest possible extension of the United States. He was of the opinion that it might come in useful to bar out any threatened invasion of a foe from the west.



A NEW EPOCH OPENED IN WESTERN RAILROADING

The Moffat Tunnel adds a fourth gateway in the barrier of the Rockies and makes possible a shorter transcontinental route practically free of serious grades and other operating difficulties. The Union Pacific found a pass a hundred miles north of Denver; and the Denver & Rio Grande was forced south more than a hundred miles before it could turn west through a gorge of the Arkansas River, but now the use of the tunnel and cut-off will shorten the distance between Denver and Salt Lake by 173 miles and six hours' running time.

The gold-seeking pioneers who came later did not find this barrier impassable, though it retarded travel and was responsible for many tragedies of the trail.

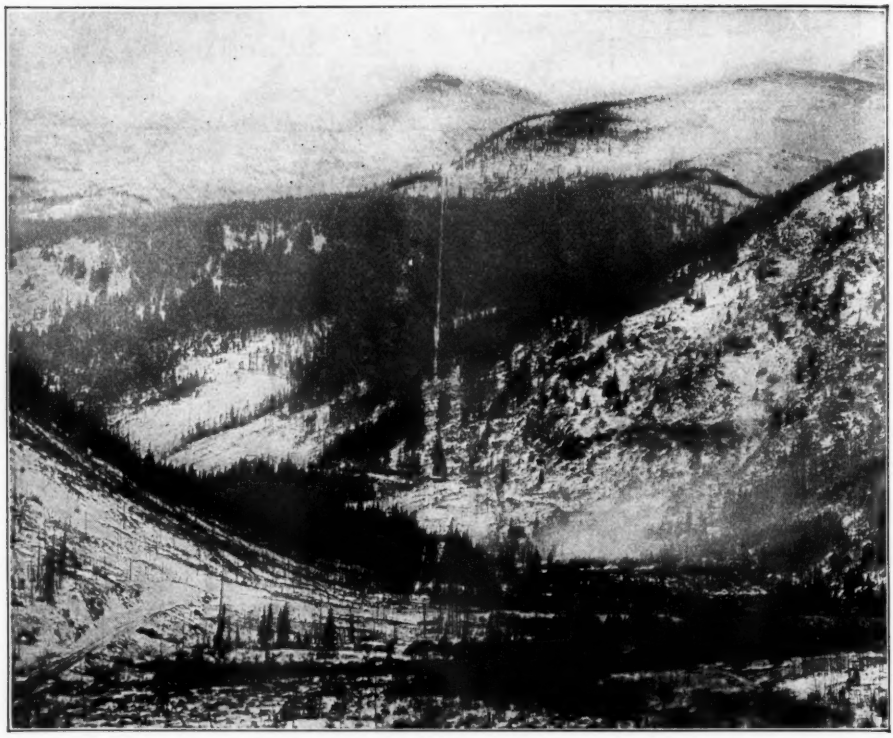


THE MOFFAT TUNNEL

The tunnel, 6.09 miles long, replaces twenty-seven miles of 4 per cent. grade and weather handicaps that swelled operation expense to ruinous totals.

Railroad men, coming later, found the main range of the Rocky Mountains, between Long's and Pike's peaks, too great to be conquered. The Denver & Rio Grande, after a lively battle with the Atchison, Topeka & Santa Fe for the right of way through the Royal Gorge of the Arkansas River, followed Pike's footsteps to the source of that stream and successfully negotiated the crossing of the range. But there were no other practical grades available in Colorado. General Grenville M. Dodge, with Jim Bridger as his guide, searched the ramparts of the Colorado Rockies, hoping to find an outlet west from Denver. His search was vain, until, at the head of one of his surveying parties, he was pursued by Indians and, quite by accident in the course of the chase, discovered the present low gradient of the Union Pacific over Sherman Hill in the southern part of Wyoming.

Meantime, Denver was swiftly emerging from its original status as a mining camp to the metropolis of the Rocky Mountain region. By all the conventions of railroad calculation it should have been on a transcontinental line years ago. But there was still the question of the mountain barrier a few miles west of the thriving capital of Colorado, which is located at the very edge of the great plains. Travelers going to Salt Lake City from Denver must either go to Pueblo, one hundred and fifty miles south, and thence westward on the Denver & Rio Grande



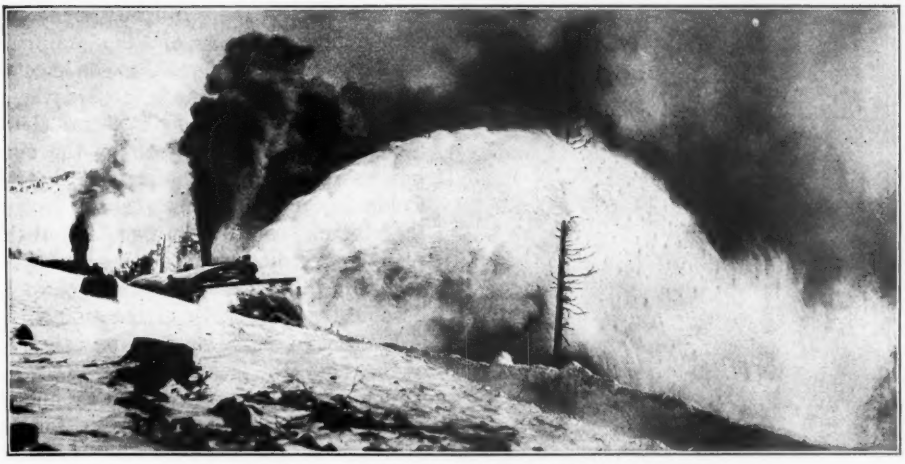
AN IMPASSABLE RANGE SNOW-BLOCKED EIGHT MONTHS EACH YEAR

In the foreground one may trace the former circuitous route of the Moffat road. The white line drawn down the center of the photograph indicates the position of the tunnel and points to the east portal, which appears as a small black spot.

Western, or must go north nearly one hundred miles to Cheyenne and thence to the Utah capital by the Union Pacific Railroad through Wyoming. A wagon road over Rollins Pass, west and north of Denver, served the needs of the miners and stockmen who had settled in northwestern Colorado. The Burlington made a survey for a railroad across this pass in the '80's, but the difficulties of construction and operation seemed too great and the project was abandoned.

It began to look as if Denver's much desired direct line to Salt Lake City never would materialize, but David H. Moffat, a Denver pioneer banker, mining operator, and railroad builder, came to the rescue. In 1902, Mr. Moffat, backing the enterprise with his personal fortune and with funds subscribed by business associates, began the construction of the Denver & Salt Lake Railroad. It was the plan to build the line over Rollins Pass and operate it until the most difficult grades over the Continental Divide could be eliminated through the construction of a tunnel under James Peak.

Construction costs were heavy. In less than two hours' run from Denver it was necessary for a train to climb more than 6,000 feet to the top of the pass. At Corona, the highest station on the line, the tracks cross the Continental Divide at an altitude of 11,660 feet above sea level. Some idea of the grades encountered can be gathered from the fact that it requires four Mallet type engines to haul a train of twenty-two freight cars over the divide. From Tabernash, on the western slope, to Denver, a distance of ninety miles, the running time is frequently from fourteen to sixteen hours.



BUCKING A BIG DRIFT ON THE MOFFAT ROAD

David H. Moffat spent his personal fortune in an attempt to scale by rail the white-crowned Continental Divide. His road climbed to an elevation of 11,600 feet at Rollins Pass, but fighting the storms which closed the line for weeks at a time proved extremely expensive.

During the winter it is necessary to keep snowplows operating constantly across the Continental Divide. Even when no snow is actually falling, the high winds, unimpeded by trees, will catch up loose snow particles and soon fill the railroad cuts. Often it is impossible to clear the drifts and railroad operations have to be suspended for weeks at a time.

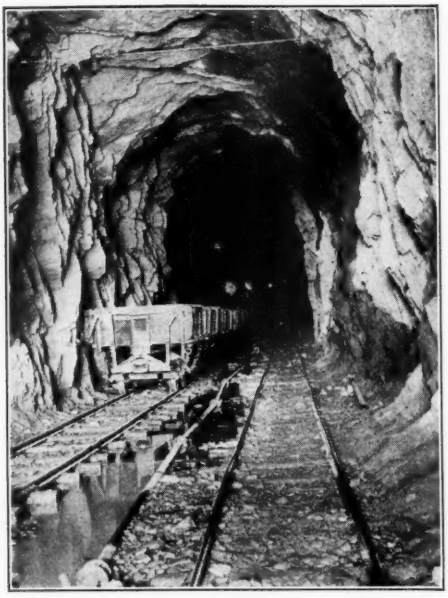
Much of the railroad construction had to be done in solid rock. Many short tunnels had to be driven. But, in spite of all these difficulties, the railroad was built as far as Craig, in northwestern Colorado, with comparatively easy going from there to Salt Lake City.

The tunnel through the main range still remained the prime necessity. It would eliminate the heaviest grades and do away with the long months of constant snow fighting. Mr. Moffat began a tireless though fruitless quest to raise funds for the tunnel, which was the key to his railroad enterprise. Nine years after he had started the Denver & Salt Lake Railroad, which has always been popularly known as the "Moffat Road," Mr. Moffat died in New York, on one of his frequent trips to enlist the aid of financiers.

DAVID H. MOFFAT

The man who as president of the First National Bank of Denver was a controlling power in Colorado's business and financial existence for a generation, started life in New York State on July 22, 1839. His career began as a New York City bank messenger. The West attracted him and his interests broadened to railroading and mining as he rose in the field of banking. He was sixty-three in 1902, when he undertook the most daring scheme of an empire builder, piercing the Rockies to place Denver on a transcontinental route. Nine years later, his personal fortune gone, he died in New York City while seeking financial aid for his railroad.

Money for the tunnel enterprise had been steadfastly withheld. The charge was made in the Colorado newspapers that established railroad interests, not desiring new transcontinental competition, had successfully



ROCK CUT AT EAST PORTAL

The tunnel is sixteen feet wide by twenty-four feet high and carries a single standard gauge track. The photograph was taken during construction, while work trains operating on narrow gauge tracks were in use. Double tracking when the traffic warrants can be secured at a fraction of the original cost.

blocked all possible sources of financial supply. Whether that was the reason, or whether financiers hesitated to invest in a project so daring, the fact remains that Mr. Moffat died a disappointed man, with his one great ambition unrealized. His railroad had penetrated the rich stock-raising, mineral, and agricultural region of northwestern Colorado, but there was no money to push it on to Salt Lake City. Trains were being operated under such difficulties that running expenses were abnormal. The railroad went into the hands of a receiver, and was barely saved from meeting the fate of several other lines and being "junked" altogether.

Determined that the tunnel project should be pushed to completion, the people of Colorado attempted community aid. Three attempts were necessary before a plan was found which proved both popular and legal. Denver in 1913 adopted an amendment to its city charter, creating a Moffat Tunnel Commission. The commissioners prepared a contract, signed by the representatives of the railroad, whereby the tunnel was to be created jointly by the city and the Denver & Salt Lake road. The contract called for a bond issue of $1,000,000 by the city, but was declared unconstitutional by the Colorado Supreme Court, on the ground that the city was attempting to lend the road its credit, means being provided whereby the railroad eventually would become the sole owner of the tunnel.

In order to secure support from the rest of the state, the Colorado State Railroad Commission advanced what was known as the tri-tunnel plan. This called for the building of the Moffat Tunnel under James Peak, a second tunnel under Monarch Pass, to be used by the Denver & Rio Grande Western, and a third tunnel at Cumbres, or Wolf Creek, on the Rio Grande. The plan was submitted at the general election in 1920, but was defeated by a narrow margin.

The Denver sponsors of the tunnel idea were not to be denied. At a special session of the legislature, convened to consider relieving the situation brought about by a disastrous flood at Pueblo, a bill was introduced creating a Moffat tunnel district, following the general plan of city improvement districts. Under this measure, which passed the legislature, a total of $6,720,000 in bonds was voted to construct the tunnel. The districts nearest the tunnel were to bear the heaviest expense. An injunction restraining the bond issue was sought but was refused by the courts. The Colorado Supreme Court upheld the constitutionality of the bond issue and refused a rehearing of the injunction suit. This left Colorado free to proceed with the project, though, owing to unexpected difficulties and delays, the cost will be $10,000,000 or more. Prominent citizens were elected members of the commission, the president being W. P. Robinson, for many years President of the Denver Union Water Company.

Work on the Moffat Tunnel was started September 20, 1923. It will be six and nine hundredths miles long and will rank among the great railroad construction enter-

prises of the world. A pioneer tunnel, eight feet square, to be used to carry water from the western slope of the Rocky Mountains to the eastern slope and also for power and for telephone and telegraph lines, is being built seventy-five feet from the main tunnel. The main tunnel is to be sixteen by twenty-four feet. Crosscuts are driven from the water tunnel to the main tunnel line every fifteen hundred feet. Headings are being driven from these crosscuts in both directions, in the construction of the main tunnel, thus speeding up work. Rock and débris from the main tunnel headings are taken out through the water tunnel.

The reason for the construction of a water tunnel in connection with the railroad tunnel is found in the plentiful water supply on the western slope of the Rocky Mountains compared with the rather limited supply on the eastern side. Several large streams, included in the headwaters of the Colorado River, drain the western slope, while on the east side there are only the Platte and the Arkansas and their tributaries. Sufficient water can be brought through the pioneer tunnel to insure an ample supply for Denver, as well as to irrigate much farm land in eastern Colorado.

In building the tunnel many difficulties have been encountered which could not have been foreseen. The west portal has been in soft rock most of the way through the first 8,000 feet. Much of this was so soft that it had to be heavily timbered. Some of the rest required heavy blasting but no timbering. Water, presumably drained from lakes far above the tunnel, presented a serious problem. Sometimes work would be carried on for days without any apparent need for timbering. Then a part of the work would suddenly cave in and the entire stretch would have to be heavily timbered. On account of the heavy blasting required in some places, large rocks would be thrown against the timbers, frequently knocking out several sets at a time. For a long time in soft ground the tunnel builders placed their timber sets close together and drove spiling ahead as fast as enough rock was excavated to make it possible to drive a single piece of spiling. In such places it was impossible to shoot at all, and picks and shovels were used entirely for the excavation.

TIMBER SECTION NEAR WEST PORTAL

The people of Colorado are the owners of the great tunnel and it is safeguarded legally against any monopolies in its use not only for transportation but for transmission of water, power, pipe lines for oil, and telephone and telegraph lines.

As the water tunnel is being built ahead of the main tunnel, it is possible to determine in advance what kind of ground will be found in the main heading, which is of material advantage to the tunnel builders. Through the soft ground it has been necessary to drive the main heading at the top of the tunnel section and to finish the enlarging and timbering afterward. After the top arch of eight feet was excavated and timbered, the portion below the arch was excavated in two benches. These benches were then excavated and timbering put in place. In the heavy ground the slips in the rock were so pronounced that the twelve-by-twelve, sixteen foot legs of the arches bulged and broke. It was necessary to use fourteen inch "I" beams for a wall plate, and twelve by sixteen inch legs. The steel "I" beam solved the wall plate difficulty.

The tunnel will be electrically operated, so passengers traveling through it will suffer no inconvenience from smoke. A unique feature will be the carrying of automobiles from one side of the Continental Divide to the other. Motorists who desire to eliminate the long climb over the pass, or who find the upper highway blocked by snow, will be enabled to load their automobiles on flat cars and the machines will be taken through the tunnel for a nominal sum. Rollins Pass is close to Berthoud Pass, which is on the Victory Highway, a much traveled route between Denver and Salt Lake City, so there is no doubt that many motorists will take advantage of this opportunity to get their cars across the main range of the Rocky Mountains in bad weather.

The Denver & Salt Lake Railroad has a contract for the use of the tunnel for fifty years, with option of renewal for forty-nine years. Having paid for the tunnel themselves, the people of Colorado purpose to keep it as a public utility, and it is not unlikely that in time other railroads will use it. The act creating the tunnel district reads:

> The tunnel, its approaches, equipment and appurtenances, shall be owned perpetually by the Moffat Tunnel District and shall remain forever a public improvement for public transportation and communication. There shall be no monopoly of said tunnel and its approaches by any one person or corporation, public or private, in respect to the several uses. Contracts for its use may be made until the capacity of the tunnel has been reached. The tunnel may be leased for no term longer than ninety-nine years for the transmission of power, telephone and telegraph lines, transportation of water, railroad and any other purpose to which it may be suited.

This throws the tunnel open to the use of any railroads now entering Colorado, or any line which may be extended to the tunnel in the future. The Denver & Rio Grande Western, if it so desires, may shorten its line from Denver to Salt Lake City by using the tunnel and building a cutoff to its main line in western Colorado. The Burlington is said to have transcontinental ambitions and will find it possible to use the Moffat Tunnel in furtherance of any plan to reach the Pacific Coast. In fact, the possibilities of the tunnel in changing the railroad map, because of its "key" position as a transportation factor, have been the subject of speculative figuring.

The boring of the Moffat Tunnel means the ultimate completion of the Denver & Salt Lake Railroad to Salt Lake City, opening up rich territory in addition to that which has already been developed. Stock-raising was the chief industry in northwestern Colorado and eastern Utah in early years. There is much undeveloped timber land, and in the mountain valleys and on the long, unbroken stretches of plateau land, conditions are good for general farming. Towns have sprung up along the railroad, and sufficient oil discoveries have been made to indicate that highly productive oil fields are among the possibilities. Immense beds of oil shale have been found, and the perfection of economical processes for the extraction of oil from shale will in time add another great industry to this region. Unlimited deposits of coal have been found in the district penetrated by the Moffat railroad. This coal is for the most part a high grade lignite, though bituminous and anthracite also have been found.

It is not intended to abandon the railroad over the Continental Divide, even when the tunnel is completed. This railroad, which is a notable engineering achievement as it stands, has been a popular attraction for tourists, who enjoy the novel experience of climbing above timberline in a brief morning's run from Denver and romping in snowbanks in July or August. After leaving Tolland, near the site of the east portal of the tunnel, the grade is extremely heavy. The train rises in a bewildering series of curves, in some places actually criss-crossing the face of the mountain. The descent on the western slope is hardly less thrilling but is made through a more heavily forested region and does not give the vast panorama of plains which the traveler enjoys on the eastern side.

It is planned to keep the road over the

mountains in operation in summer for special trains, but the main travel will be through the tunnel. Twenty-three miles of most difficult travel over the crest of the continent will be cut off by the tunnel. The eastern portal of the tunnel is fifty miles from Denver, at an elevation of 9,190 feet. The elevation of the western portal is 9,100 feet. The peak of the tunnel is near the center, allowing drainage both ways. The tunnel at its highest point will be 2,440 feet below the present crossing at Corona, on the crest of the divide. It is estimated that 41 per cent. of the Moffat road's operating expenses is due to bad snow conditions, most of which will be eliminated when the tunnel is completed, as the greatest amount of expense is centered around Corona. In building the tunnel more than 2,500,000 lbs. of explosives will have been used.

THE WORLD'S LONGEST RAILWAY TUNNELS

	miles
Simplon (Switzerland-Italy)	12.26
St. Gothard (Switzerland-Italy)	9.32
Loetschberg (Switzerland)	9.03
Mont Cenis (Italy-France)	7.98
Arlberg (Austria)	6.23
Moffat Tunnel	**6.09**
Ricken (Switzerland)	5.33
Tauern (Austria)	5.31
Ronco (Italy)	5.16
Tenda (Italy)	5.03
Transandine (Chile-Argentina)	5.00
Connaught (Canada)	5.00

The new Cascade Tunnel, on the Great Northern Railroad between Berne and Scenic, Washington, which will be 7.79 miles long, will probably be completed in the summer of 1928, at a cost of $10,000,000.

The tunnel will shorten the present rail distance from Denver to Salt Lake City by approximately 175 miles. Citizens of Utah have taken up the question of aiding in the extension of the Denver & Salt Lake line to Salt Lake City. Among the benefits expected to be derived by Utah is the development of rich beds of gilsonite.

The ceremonies at the opening of the tunnel will be marked by many tributes to the memory of Mr. Moffat, whose efforts were largely responsible for this great project. Mr. Moffat was sixty-three years old when he took up his greatest work. He had come to Denver in 1859, among the earliest of the pioneers, and engaged in the banking business. He was heavily interested in paying mines in the days of the Leadville and Cripple Creek booms. The railroad business had always appealed to him, and he had been one of the men responsible for getting the extension of the Union Pacific from Cheyenne to Denver, the first railroad to the Colorado capital. Next Mr. Moffat built the South Park line from Denver to Leadville, a road which paid large dividends from ore tonnage. When railroad men were hesitating to build a road to the newly discovered camp of Cripple Creek, Mr. Moffat built the Florence & Cripple Creek, also a highly profitable venture. In 1865, he became president of the Denver & Rio Grande and built a branch of that line to the once flourishing silver camp of Creede, which road is said to have paid for itself in its first year of operation.

Railroad conditions had changed, and costs of construction had greatly advanced when Mr. Moffat took up the stupendous project of a direct line from Denver to Salt Lake City. Meeting with little encouragement from others, Mr. Moffat courageously took up the task single-handed. He spent $20,000,000 and was still fighting up to the day of his death.

The building of the Moffat Tunnel through state aid is one of the most notable instances of public help being extended to a railroad since the days of the free land grants for transcontinental construction. But, through the leasing of transportation, power and water rights and oil pipe lines, it is believed that the tunnel can be made to derive a large and steady income. Its chief benefits are expected to come in providing a new outlet for transcontinental traffic and in the development of rich territory heretofore difficult of exploitation because of adverse conditions of transportation.

The Dollar at Work in Europe

The Story of the High Achievements of American Business Abroad

GREGORY MASON

Uncle Sam is known as "Uncle Shylock" only in limited areas and under special political circumstances. In many foreign countries the dollars of American business are known for their good work in raising the standards of living and in promoting the welfare of populations in wide areas. In this article Mr. Mason tells of new achievements of American business in Europe, and in the August issue he will tell of the work in the Orient.

IN PREVIOUS ARTICLES I have described as a manifestation of the heart of the dollar the humanitarian effort which American capital exerts for the benefit of native labor in comparatively undeveloped parts of the world. The large American corporation operating in Europe, however, finds not very much that needs to be done for the physical well-being of its employees, for the European standard of living is very similar to our own. But if Europe takes little from the heart of the dollar she is learning much from the mind of the dollar. That is to say, Europe is very much engrossed in watching our studied measures for efficiency, our short cuts to labor saving, our devices to stimulate extreme production—in short, our whole technique of industry.

For example, the managers of the great factory of the Singer Sewing Machine Company at Clydebank, Scotland, have not had to provide comfortable modern homes for their workmen as they should probably have had to do were the factory in Brazil or Central America. Having furnished their employees with such facilities for recreation as are contained in tennis courts and a concert hall, they find no further "welfare work" necessary among their intelligent and self-sufficient Scottish working people. Much the same is the experience of the directors of the Standard Oil Company of New York and the Standard Oil Company of New Jersey, two organizations which between them cover most of Europe. Foreign sociologists and industrial leaders, however, have expressed the keenest interest in certain economic policies which the leaders of these great oil companies have inaugurated out of their conviction that the thrifty employee is the best employee. Thou-

TELEPHONE HEADQUARTERS FOR MADRID, SPAIN

This imposing fourteen-story structure under construction on the Gran Via, Madrid's magnificent commercial thoroughfare, will house the Compañia Telefónica Nacional de España, an arm of the International Telephone Corporation, New York.

SOVIET RUSSIA IS TO DEVELOP THE MIGHTY DNEIPER
An immense hydro-electric plant on the Dneiper River about two hundred miles north of the Black Sea will be built by American engineers, Hugh L. Cooper & Company.

sands of Europeans working for these corporations have the benefits of the generous pension and insurance systems and of the system by which employees may buy stock in these companies.

The workman who has served Standard Oil for twenty years or more may retire at the age of sixty-five with a life pension ranging from 40 per cent. to 70 per cent. of his wages, according to his length of service. Moreover, if he has been thrifty he has by this age accumulated a pretty nest-egg by taking advantage of the plan under which the company gives him fifty cents worth of stock for each dollar's worth which he buys out of his wages. The Standard Oil Company of New Jersey alone has some twenty thousand employees throughout the world who have invested in its stock. And last February this company allotted forty million dollars' worth of its own securities to employees who had been saving the price of it out of their wages for five years. One of the beauties of this plan is that it is a gradual process, and the company does not donate its fifty cents to match the workman's dollar until he has shown the seriousness of his intention by saving over a period of at least three years. Naturally, the unfavorable rate of exchange handicaps the European laborer who would become an American capitalist, yet in spite of this drawback many humble European toilers have had the thrill of becoming the owners of stock in these great and famous Yankee corporations.

The size and munificence of American industrial effort is alone impressive to Europeans. The Belgians have been astonished at the growth of the factory of the Bell Telephone Manufacturing Company in Antwerp. Four years ago two thousand men and women found employment in this plant, which has been constantly added to, until now it is manned by nearly five times that number of workers. It is to-day the largest factory in Antwerp. It is running twenty-four hours a day. And the Belgians are interested to observe that although the employees work in three shifts and under great pressure the management yet has time to exert the utmost care for their well-being.

The same features which appeal to the Belgians in this undertaking have aroused the admiration of the Spaniards in an even greater industrial effort which Americans are conducting in Spain. The International Standard Electric Company, a subsidiary

of the International Telephone and Telegraph Corporation, by contract with the Spanish Government has been unifying and expanding the local telephone system of the country of Alfonso XIII. It is now possible to talk from any part of the kingdom to any other.

The average Spaniard, looking at the huge headquarters building of the telephone building which is now rising on the Grand Via, Madrid's fine new boulevard, may not realize how much American capital and American brains has had to do with constructing this tallest building in Spain as the center of the newly expanded national telephone system. For obvious reasons the Spanish Government has preferred to have this telephonic expansion appear outwardly to be a 100 per cent. Spanish undertaking. On this account a number of prominent Spaniards formed the Compañia Telefónica Nacional de España, the name by which the new national system is now known to all the subjects of Alfonso. The directors of the International Telephone and Telegraph Corporation are quite content to have their brains and dollars serve Spain silently. Yet from the employees' locker-rooms in the basement, through the infirmary and operators' rest-room on the seventh floor, on to the assembly room and library for employees on the fourteenth and top story, beneath the public observatory in the tower which suggests the soaring tip of a lesser Woolworth Building, Yankee ideas are everywhere conspicuous.

Follow the long distance lines which run out from the hub, Madrid, like the spokes of a wheel and you will find in even remote smaller Spanish cities the same evidence of the American industrial philosophy, with its underlying conviction that the comfort and happiness of the employee is essential to the full success of any industrial enterprise. There is an infirmary in connection with all the larger exchanges throughout the country, and many which are not so large have a restaurant in connection and a social hall for the diversion of operators off duty. As for the good American custom of hot coffee for night operators, this is becoming ubiquitous.

The Madrid factory for making telephone apparatus is managed with the purpose of using Spanish raw materials whenever possible. Tact if nothing else endorses the general tendency of American industrial engineers abroad to minimize the importance of American methods by a

THE LARGEST CONTRACT EVER LET IN THE NEW NEAR EAST

About 5,000 workmen will be required for perhaps seven more years to complete the necessary system of great drainage canals and levees for the reclaiming of Salonika Plain. The estimated increase in value of the land from the operations will be $56,000,000.

plentiful use of native material. A good example of this is found in Poland, where Ulen and Company, of New York, is engaged in a large program of construction for no less than ten cities. This work is chiefly the construction of water-works, sewer systems, schools, slaughter houses, public baths and permanent barracks for laborers. As the laborers actually employed in this work by Ulen and Company live in their own homes there is not much chance for the exhibition of American ideas concerning workmen's welfare, but there is a large demonstration of that keenness in coping with purely technical problems which lies behind the mind of the dollar.

In Greece, however, where this same American corporation is building a water supply for Athens, Piræus, and the vicinity, the workmen come more directly under the régime of the American managers. Near the great dam which is to be built the men will live in a big camp at Marathon, eight miles from the dusty plains where the warriors of Miltiades turned back the hordes of Xerxes. Finding that the laborers of the community were undernourished, Ulen and Company engaged a food expert to create a menu based on calorific values essential for a full day's work. With the further help of a medical examination before the men are hired the rate of labor turn-over has been reduced from forty to twenty-two.

Also under the Greek flag the engineers and foremen of another American company are engaged in a tremendous undertaking, nothing less than building a large piece of new territory for Greece.

The treaty which closed the war of 1922 between Greece and Turkey arranged that all Turks should leave Macedonia and that all Greeks should get out of Anatolia. There ensued one of the most picturesque exchanges of refugee population which the world has ever seen. The individual Turk got the better of the deal, because less than a million worshippers of the Crescent found themselves dividing up the land which had been vacated by a million four hundred thousand Greeks. Naturally there has been a land shortage in the country of Venizelos. It was to produce new land for these returning Greek refugees that the Greek Government engaged the Foundation Company of New York for the stupendous task of reclaiming nearly three hundred square miles of swamp lands back of Salonika. Another two hundred and thirty square miles of territory is to be protected against floods, which means that levees must be built along the banks of four rivers, the Alikamon, Loudias, Galiko, and the Axios—or the Vardar, as foreigners usually call it.

AMERICAN PIPE LINES NEAR HADRIAN'S ARCH

This famous double gateway of antiquity, one half built for ancient Athens, the other for the then-new city of Hadrian, overlooks modern salt water lines laid by American engineers. Hadrian's city has lost its identity in Athens, but his aqueduct still supplies fresh water to the people.

This work has been under way about a year now, but perhaps another seven years will be required for its completion. At present only a few hundred laborers are employed, but eventually five thousand will be engaged. The plain of Salonika has a vicious climate, marked by violent

heat in summer and cold winds sweeping out of the Serbian mountains in winter. The worst enemy of man in this locality, however, as the Allied armies found out to their cost, is the malarial mosquito, which breeds in the swamps the Foundation Company is to drain. It is said that at one time half the French force of three hundred thousand men was incapacitated by malaria. Naturally, the first task of the Foundation Company has been to fight this disease. Here, as in Panama, the doctor has preceded the engineer.

Not only will the health of all Greece be protected by the elimination of this danger, but the country will be enriched by a delta soil which will produce excellent tobacco, cotton, beets, wheat, and corn. Not far away the most expensive tobacco in the world is grown, and experts say that there is no reason why it should not flourish where the swamp now breeds mosquitoes. Greece, like Japan, suffers from a shortage of arable land. In 1924, she paid $60,000,000 in gold for imported flour, approximately 597,000 tons of it. It is estimated that the Salonika plain could produce 550,000 tons of wheat and corn—nearly enough to wipe out the deficit in food stuffs. And if the land were devoted to cotton, tobacco, and other high-priced crops the income would be much greater.

To make sure that shipping will be available to carry off these future crops the Foundation Company is going to turn the Vardar River from its present mouth to its original channel. This is not far from the harbor of Salonika, but sufficiently far away to eliminate the danger that this harbor will become too shoal for deep-water ships because of the fact that the river in its present course is depositing millions of tons of silt annually over the floor of the sea. The bill for moving one river alone will amount to about $34,000,000. But the Greek Government will be able to settle 120,000 refugee agriculturists on the new land, and proposes to sell it to them on twenty-year installments, to net the government ultimately some $56,000,000.

The money to pay for the immediate work of reclamation was raised by London and New York bankers through an international finance commission which has the backing of the League of Nations. It is interesting to know that this contract, the largest ever let in the Near East, was secured by this American company only after severe competition with Germans, French, Belgians, and Greeks.

The decision of the Greek Government to choose American engineers in this case has been imitated all over Europe, but nowhere more frequently than in Russia. There is no exaggeration in the statement cabled only a few months ago by James Mills, Associated Press correspondent in Moscow, that it is "the general policy of the Soviet Government to give preference to the services of American engineers wherever possible, because in the opinion of the government America leads the world in the qualifications and achievements of its technicians."

There is romance in this. In natural resources, in social and economic complexion there are many similarities between Russia and the United States. Russia is to-day at about that point of development where we stood sixty years ago. In many cases the American technicians who are called to help the development of Russia have merely studied the history of the industry of their own country for excellent examples of what to do and what to avoid doing.

The mineral and fuel deposits of Russia are among her richest assets. Yet in some Russian coal mines the output per man per day—the universal standard of mining efficiency—is only half a ton. By this same standard American mines lead the world, and in some of them the output per man per day goes as high as fifteen tons. It is not strange, therefore, that when in the fall of 1925 Russians decided to study foreign mining methods they sent a commission to the United States. The result of this study was that Russia has placed large orders for mining machinery in our country and that the Russian Government bureau controlling the coal fields in the rich Donetz Basin, north and inland from the Black Sea, invited Charles

SALT WATER RESERVOIRS FOR MODERN ATHENS

Not only the financing, designing, and construction, but also the operation for twenty-two years of the salt water works of Athens is being handled by Ulen & Company, New York. Modern Athens is shown in the picture, ancient Athens and the Akropolis lying in the opposite direction.

E. Stuart, of the engineering firm of Stuart, James & Cook, to examine Russian mines and advise how to improve Russian mining methods. Accordingly, Mr. Stuart went to Russia last fall.

This Donetz Basin holds the largest and most valuable coal deposits in Europe, including both the hard and soft varieties. There are, moreover, in this region deposits of manganese and iron, salt, mercury, and limestone, and manufacturers of many things, especially farm machinery, cement, pottery, chemicals, and glass. Indeed, the whole district might be called Russia's factory, corresponding roughly to the northeastern part of the United States.

Mr. Stuart's conclusion is that Russia has thrown off the old laziness which was reflected by the ancient popular catchword "*nitchevo*" ["it doesn't matter," or "never mind"], but is handicapped by lack of capital and modern tools. "I found the mines as well as the mills thoroughly manned and intelligently operated," Mr. Stuart says, "but usually equipped with antiquated machinery."

Owing to this drawback many mines and mills have to-day only about three quarters of their pre-war production. The antiquated machinery which this American investigator would scrap was built largely in Germany. Germany, of course, dominated Russian industry before the war. There is now an excellent chance that American influence will supplant German in Russian industrial life. Mr. Stuart and other American engineers are now in Russia coöperating with Russian engineers in making an inventory of just what new tools national industry needs. If their advice is accepted by the Russian Government it is estimated that within a few years Russia will spend from $25,000,000 to $50,000,000 on modern American machinery, the amount depending upon the credit which American business men will give.

Another example of the respect in which the Bolshevik Government holds the mind of the dollar is found in the case of a big hydro-electric project in southern Russia, not far from the rich coal mines just mentioned. Russian engineers had planned to build a dam across the Dneiper River at a small town named Kichkas. When asking for the advice of Hugh L. Cooper &

Company of New York, they were told that by several radical changes as much as $8,000,000 might be saved. The Americans are now supervising the whole job, which will take about six years and will mean the buying of much equipment in the United States. A granite-faced, concrete dam 700 meters long and 60 meters high will be thrown across the Dneiper, a power house will be built on the west bank and three 400 foot locks on the east bank. The total cost of the project will be about $65,000,000, and 650,000 horsepower will be developed, to be used for the advantage of a wide section of the rich "black earth" region of Russia. Incidentally, navigation will be much helped for some distance above the dam owing to the increased depth of the water which will result from this project.

This huge undertaking is still in its preliminary stages. Before it is in full swing two great labor camps, with lighting, water, sewerage, and fire protection systems must be built on the banks of the river to accommodate more than four thousand laborers who will be employed. The sociologists of the Soviet Government have made a hobby of improving the living conditions of the masses of Russian workers, and the American engineers are encountering an unusual degree of cooperation in their designs for the welfare of the workmen. In the past Russia's economic development has been hindered by the prevalence of what Americans call "graft" in commercial and governmental circles. It is reassuring then to hear Hugh L. Cooper—who by the way has had the distinction of building water power plants at Niagara Falls and Muscle Shoals—testify that Russia is outgrowing this weakness. Speaking before our National Association of Manufacturers some months ago Colonel Cooper said:

"My experience was that wherever I met anybody in authority, I was talking not only to a very intelligent man, but also to a very honest man. I had the opportunity of listening to five or six very able English-speaking observers in Moscow who have been there from two to four years, and their testimonies all agree that the Russian Government as it exists to-day is not only a stable government, but that it is an honest government, as far as any graft or money or anything of that kind is concerned.

The largest foreign concession in what may perhaps still be loosely called Russia is the monopoly which was given to W. A. Harriman & Company to dig and export ore from all the manganese mines in Chiatouri, Georgia. The terms of the concession required that among other things, the American firm build a railway between Sachheri and the port of Poti, and organize and equip this port. Preliminary surveys by the Harriman engineers, however, showed that the railway would cost nearly double the $2,000,000 allotted them for the purpose. The American firm's recent negotiations resulted in the Soviet's agreeing not to compel them to double-track this railroad. Accordingly, the Harriman concession should soon provide an excellent illustration of how American economic enterprise develops a backward foreign country.

Perhaps the most clear-cut example in Europe of the benefits of the use of modern American industrial methods is also found in the mining industry, but in Poland, not in Russia. What makes this case more striking is that American skill has been exercised in comparison with German, for the Germans usually are rightly considered among the best engineers in the world. The case is that of the famous Von Giesche Company's zinc and coal mines in Silesia. The boundary decision which followed the Upper Silesia plebiscite in 1922 cut this rich mine in two, attaching two thirds of it to Poland and leaving only one third in Germany, although the whole property still remained in the control of German capitalists. The latter organized a Polish company to work the larger piece of the mine. In spite of this, officers of the Polish Government became alarmed, because before the new international boundary was drawn tunnels had been dug underground connecting what remained Germany with what became Poland, and the Polish patriots were afraid of subterranean theft of ore. The Germans retorted

that they lived in the same fear of being robbed, and for a while it looked as if an extremely picturesque underground war might ensue. But at last an imaginary boundary line was drawn and all tunnels that crossed it were walled up with solid concrete.

Still the nominally Polish company did not flourish, the German owners asserting that their property was being taken away from them by taxation. In their distress they decided that the only way out of the difficulty was to let the control of the Polish company pass from marks to dollars. Here enters the Anaconda Copper Company. After long negotiations, complicated by the vicissitudes of Polish revolutions, a Silesian-American corporation was formed under control of Anaconda which took over all capital stock of the Polish company and in addition has bonds covering a $6,000,000 loan to the German company still operating the mines on the German side of the international boundary. The Silesian-American corporation is now acting as unofficial adviser to the German company.

In the Polish property, which American capital now definitely controls, there are more than 20,000 workmen. It has not been necessary to do anything to improve their living conditions inasmuch as these were already excellent as determined by the German capitalists. Indeed, at one of the mines there is a model village for the laborers which resembles the community of picked suburbanites at Forest Hills, New York. Two families live in each little red-roofed house, but each family has its own garden with flowers and vegetables. On the outskirts of the village are groves of lovely trees. The usual industrial atmosphere with its bare yards, its piles of junk and waste material, is noticeably absent.

Therefore, the American effort is chiefly noteworthy not in the sociological by-ways of this industry but in putting the mining business on its feet. Race prejudice, which resulted in the overtaxation of the company when it was controlled by Germans, is now conspicuous by its absence. American machinery has provided improved methods of refining the ores. Mines as well as smelters and concentrators have been equipped with labor-saving machinery, and the application of better judgment in deciding where and how to dig the ore from the earth has also reduced expenses. The results, which speak for themselves, have attracted much attention in European industrial circles. In the few months that Americans have had control the ton-per-man output has increased 20 per cent. over the best previous record and 100 per cent. over some of the previous low averages. And thus a great mine which was in danger of being ruined by the bitter animosities of European nationalism has been not only saved but also greatly developed by the help of the American dollar and the brains behind it.

It cannot always be safely assumed that American labor-saving devices will prove profitable to instal abroad. For an apparatus which may save many dollars in this country where labor is expensive, may actually be uneconomical to operate in lands where labor is cheap. An illustration of this truth is provided by the case of the Assouan Dam. The builders of this great water barrier found that it really paid them to use hand labor to a very large extent.

The fact remains that almost throughout Europe one finds a strong sentiment in favor of "Americanizing" the local industries. "For the most part," reports H. Lawrence Groves, our commercial attaché at Vienna, "ideas are quite vague as to what must be done to accomplish this result. But in general it is recognized that inherent weaknesses exist in the majority of Central European industries, owing to bad organization, lack of modern machinery, and, what amounts to the same thing, continued use of antiquated machinery."

To combat the evil situation an "American committee" was organized by the—take a long breath now!—Niederoesterreichische Gewerbeverein, one of the principal commercial and industrial organizations of Austria. The object was to inform the association members as to the latest developments in American industrial

practices. At a recent meeting of this organization under the auspices of its American committee Dr. Grohmann, head of the textile firm of Grohmann and Company, Wuerbenthal, Czechoslovakia, delivered a lecture telling how it is possible for European manufacturers to beat Americans at their own game. As reported by Mr. Groves, Dr. Grohmann said in substance:

"In most European industries only 10 per cent. of the employees of an enterprise devote all their ability and interest to the undertaking, while 90 per cent. are indifferent or even hostile to the enterprise. By improving the working system it should be possible to enlist the interest of at least 70 per cent. of the workers, as is the case in America. Means of production having increased after the war, buying power having declined to one third and even one half with resulting greater competition, and profits having been greatly restricted, more profitable operation is all the more necessary. American industries have improved their methods of organization and production as well as their methods of procuring new capital. Europe is threatened by America's competition. But it is quite possible to achieve greater performance in Europe and even to exceed America in this respect if the task be approached in the right spirit.

"The Bata shoe factory at Zlin, Czechoslovakia, is a striking example. Within three years the performance of a workman within a given time limit has been advanced beyond the American level. In 1922, the daily performance of a workman was two pairs of shoes. In 1925, it was ten pairs. The total bank deposits of all employees amount to 20,000,000 Czech crowns, bearing 10 per cent. interest. Every worker has a daily quota to perform and is allowed to leave work when he has finished the task assigned to him. If he cannot finish within eight hours he must stay on until he has finished. The average fixed wage or salary is at most 300 Czech crowns a week, but actual incomes amount to several times that sum, through participation in the profits. The extent of such participation is carefully worked out, one half of each man's share being paid with his weekly wage and the other half being placed in an interest-bearing savings account. Such deposits are payable within one year after the retirement of the employee from the service of this company. The departments hold daily conferences to discuss all current matters. Moreover, chiefs of departments participate in the losses. Capable workmen are able to earn as much as 500 Czech crowns as weekly wage with an additional 200 crowns as average weekly share in profits.

"A second example of European business organization is furnished by the Witkowitzer Iron Works, where the so-called Lud System, invented by Inspector Ludwig, is in effect. The Lud bookkeeping system, costing from 20,000 to 30,000 Czech crowns [$600 to $900], permits one clerk to make 5,000 entries an hour, while the best American system makes 20,000 to 30,000 entries a day and costs perhaps ten times as much."

Dr. Grohmann's words may be disconcerting to Americans, showing as they do a determination to beat us with our own weapons. But imitation is to-day as ever the sincerest form of flattery and we may well be proud as we watch the growth of the European tendency to appropriate the industrial devices and the industrial philosophy which originates in the mind of the dollar. And even more may we be proud of another thing which Dr. Grohmann mentions, namely, the success of our industries in evoking the sympathy and coöperative interest of the bulk of employees. For here is indisputable evidence that the dollar has a heart as well as a mind, and that that heart is sound.

American dollars at work in the Orient, Hawaii, and the Philippines will be the subject of Mr. Mason's final article in this series, next month.

PERSONALITIES

George VI. of Arizona

A Governor With a Record Term of Service

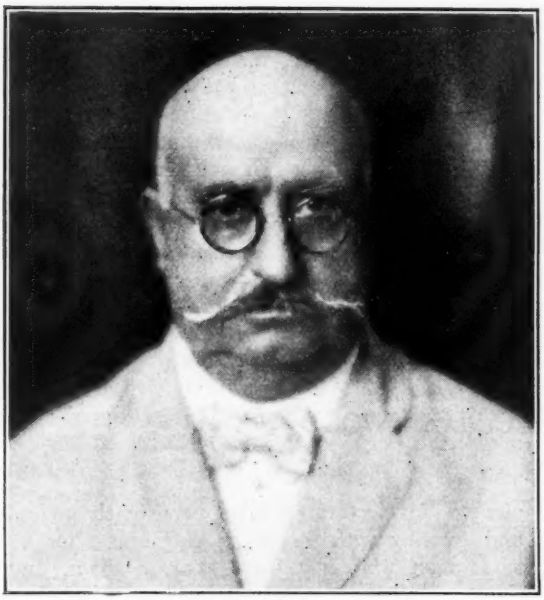
FRANK C. LOCKWOOD

GOVERNOR HUNT'S political enemies like to picture him as radical, uncouth, and illiterate. His face, figure, and mannerisms easily lend themselves to caricature. He does not deny that he is no longer petit; and he has never desired to be among the élite. As for his grammar, Arizonans have no trouble in understanding what he says. Moreover, he has shown himself to be one of the most forceful and original characters in American public life to-day. Seven times he was elected to the territorial legislature; he was chosen a member of the Constitutional Convention; he was made president of that body; and then he became the first Governor of the State of Arizona. He was reëlected Governor, and again reëlected; and, with the exception of two two-year terms, he has continued to occupy the Governor's chair since 1912. And now he is serving his sixth term.

Being Governor of Arizona is for him no longer a mere honor, or incident, or accident—as it might be for some men; to be Governor has become his regular occupation. Indeed, his foes can find no worse charge to bring against him than the fact that he is setting before the youth of the land the shameless and un-American example of being perennially reëlected Governor of his state. They called him George V during his fifth term and now they call him George VI. In retaliation, he replies that if he lives long enough he will go on and become George VII, VIII, and IX.

An electorate will not persistently go on voting with increasing enthusiasm for a man who is a mere boor, a sham, an anarchist, an autocrat. There must be something worth while about such an individual. Wiggam insists that "blood will tell"; and in George Wylie Paul Hunt we have a fine example of this dictum. It is amazing how these masterly American rulers of the people—men of toil, men only gradually and almost by chance (so it seems) emerging from the masses of obscure fellow-citizens with whom their lot has been cast, men in the rough, rising by their own character and effort—it is startling to note how these dominant men are invariably the product of dominant ancestors.

Governor Hunt's grandfather founded Huntsville, Missouri. On both the paternal and the maternal side he traces his lineage to Colonial times through soldiers, scholars, and statesmen, and through virtuous, brave, and gifted women. By both lines of descent (a Democrat to the bone) he goes back to Virginia and North Carolina stock. A remote ancestor on his mother's side was sent over with Lord Baltimore, and was surveyor of the Port of Baltimore. Another maternal ancestor was an officer in the Revolutionary War. The wife of this ancient rebel was a sister of Patrick Henry's wife. In the early days of the Revolution he went with a company of insurgents and burned down the mansion



GOVERNOR GEORGE W. P. HUNT
He was the first Governor of the State of Arizona and, with the exception of two two-year terms, has occupied the gubernatorial chair since 1912.

of the Governor of Virginia. The deeds of this remote radical are interesting because the name "Paul" in Governor Hunt's triple-wrought cognomen has descended upon him through many generations in consequence of a family tradition inaugurated by the officer. At that time soldiers went to join the colors in the summer, but they spent the winter at home, and ploughed or taught school. A son was born to this officer while he was under arms, so he asked the company to name him. They gave him the name John Paul Jones Christian; and since then every generation of Christians has named some one after John Paul Jones.

Governor Hunt's relationships connect him also with Richard Yates, the War Governor of Illinois, and with Chief Justice Marshall. His grandfather was a slaveholder, a graduate of William and Mary College, and the possessor of a fine library that contained many of the classics. Governor Hunt's father went to California in 1849, and upon his return to Missouri married the daughter of John Marshall Yates. During the Civil War the family plantation was laid waste and the slaves were liberated; but though the future Governor grew up in poverty, he attended school until he was eighteen. This schooling, though, was poor, as textbooks were not provided, and so such as he had he was obliged to borrow.

At eighteen he ran away from home to escape becoming a doctor, it being a tradition in the family that there should be a doctor in each generation, and his mother desiring that he should study medicine. He went to Colorado and picked up any work he could get—washing dishes and serving as a waiter in a restaurant, among other things. More than once after this time he turned waiter. He tells of a certain man who came into Globe in the early days with a big pack train to buy supplies. Hunt used to wait on him at the restaurant. Years afterward when Hunt was a candidate for the governorship he visited this man's town, and heard it said that he had declared: "I never will vote for him for Governor; he used to wait on me." Hunt went to see him, and asked:

"Do you remember me?"

"Yes, I do; you used to wait on me."

"I was a pretty good waiter, wasn't I?"

"Yes."

"Well, I should make just as good a Governor."

The "Hunt Machine" is much talked of in Arizona. It constitutes the prime discomfiture of the Governor's political opponents. It rides them like a nightmare, and is held up as an ogre to frighten any respectable citizen who may by any chance be drawn toward the Hunt camp. Recently a Republican asked a veteran Hunt Democrat to tell him something about this machine. The Governor's friend replied:

"Well, it is a complex thing and is made up of many parts. For example, in the early days, when Hunt was in the Old Dominion

Store, at Globe, some prospector would come in from the mountains broke and down-at-the heel, and Hunt would grubstake him, and send him back rejoicing to continue his lonely search for treasure. He never turned any one away who was down on his luck, and he asked no questions. He would say simply: 'Keep away from the whisky; work hard; and keep on going.' When these men came back they were always welcome. These fellows all became members of the 'Hunt Machine,' and some of them are still living around the big mining camps.

"A certain man from Globe had been divorced from his wife, and had to pay alimony. The woman soon married a rich gambler, and sent word to her former spouse that he could keep his money—that she had no further use for it. He moved to California, married again, and became the father of two children. Meantime, his former wife fell into poverty and demanded that the alimony be renewed. This was a hard blow; the man was not prepared to pay the money; so he was arrested for contempt of court. The judge could not see how it would do any good to sentence him to jail, so asked him if he could pay three months arrears and give bond for future payments. But he knew of no one who would go on his bond.

"'Think hard,' said the judge, 'and see if you cannot recall some friend.'

"'Well,' he said, finally, 'I used to know Governor Hunt.'

"The judged smiled and said, 'Just the man.'

"The Governor came to his aid, paid the back alimony, and went on his bond. Then and there a new wheel was placed in the Hunt Machine, and many other parts were added as the story went around. Scores of similar incidents might be told and are told all over Arizona." In short, it was made clear to the inquiring Republican that the so-called "Hunt Machine" is made up of hundreds of strong and delicate parts; and that, whether screw, cog, wheel, belt, or battery, every part is wrought from the invisible material that binds man to man in ties of friendship and loyalty. The Governor's life motto, I may add, is: "Remember your friends and forget your enemies."

THE CHIEF OF THE "HUNT MACHINE"
Analysis of the "Hunt Machine," says the author, reveals the life motto of its builder: "Remember your friends and forget your enemies."

"What are the achievements in your career that you look upon with the greatest satisfaction?" I asked Governor Hunt.

"In the early days, the passing of laws against the saloons," the Governor replied. "They were terrible at that time. I succeeded in passing laws: *first*, to keep women out of saloons; *second*, to prohibit gambling; and *third*, to raise the license on saloons. Judge Kibby was Governor then; and he called me into his office and showed me a telegram from President Roosevelt, commending this legislation. I have always been proud of getting a law passed to provide free textbooks for school children. It was through my effort that the initiative and the referendum were written in the Constitution of Arizona, and I think I

never performed a greater service for the people.

"Then I am gratified with the results of my prison reform policy. I initiated the plan of road-building by the prisoners. Seventeen other governors adopted my prison policy after I introduced it. We could not pay the prisoners for this work, nor their families; there was no law for this. But we allowed them double time. This road-building by prisoners has been a wonderful thing for them, and for the state as well. The four hundred and fifty men in the state prison became a constructive force for the building up of Arizona. To encourage self-respect, we removed their stripes and gave them gray uniforms. In different parts of the state road camps were established, and better health and greater efficiency was the result. It was discovered that a prisoner's sense of honor, when put to the test, was a more effective guard than a man with a rifle. It is a basic principle of the new penology that a man reforms only as he is trusted and made to rely on himself. One thing that started me on my prison reform was Victor Hugo's story 'Les Misérables.' That impressed me deeply, and influenced me greatly."

Governor Hunt is a sort of prose Walt Whitman. He loves his fellow-men. The under dog is dear to him. He does not have to court labor; he is to the manner born. Labor understands and trusts him. He is of a piece with labor. He has an unfailing sense of humor—odd and comical, but individual and effective. A strong quality is his superb reticence. He has the art of saying nothing constantly in many languages when besieged by henchmen and by enemies. He breaks no promise, but he rarely gives one. He is shrewd, farsighted, and diplomatic; he has original ideas, too, and intellectual force. He makes fresh friendships with the young at the same time that he keeps alive the tried comradeships of the past. He is a strategist, and is skilled in every device of the wily foes whom he constantly meets in the political arena; but he is no "Heathen Chinee," with his sleeve full of false cards. He has sturdy, rugged courage equal to any occasion. And, finally, he is downright honest. During his long public career not a suspicion of evil has sullied his reputation. He has been absolutely above the influence of money, and has stood for the rights of the people and the honor of his state.

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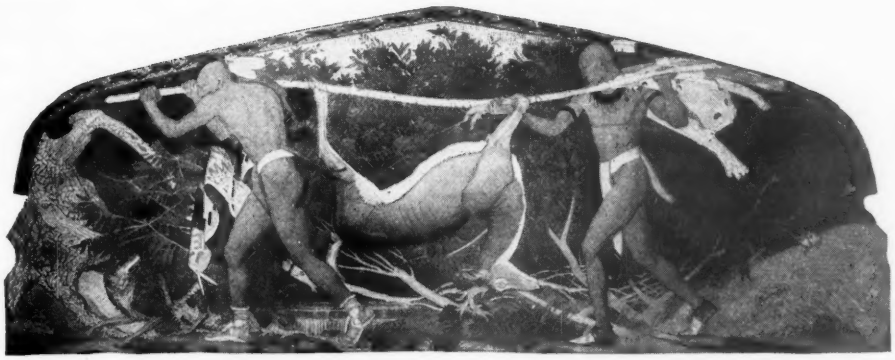
THE STATE CAPITOL OF ARIZONA AT PHOENIX

The palms, flowers, and lawn of the capitol grounds are typical of Phoenix and the rich Salt River Valley which is irrigated by the great Roosevelt Dam, seventy miles distant. Phoenix became Arizona's capital in 1889.



"The Indian Hunters," by Barry Faulkner, in the Washington Irving High School, New York City

What Young America Is Thinking

And Why Youth Scoffs at Ministers and Politicians

MONTAVILLE FLOWERS

Why do few of our high school students aspire to be ministers or farmers, and why do they scoff at politicians? This article answers the question. In 1926, Montaville Flowers visited 92 representative public and private high schools in fourteen states from Massachusetts to California and addressed 100,000 students in a total population of 44,840,000 in these states. His purpose was to discover the mental attitudes of high school youth on matters of vital social interest. In the June issue he described the methods of his study, which revealed unexpected currents of thought in the youthful mind throughout the nation. In this article he continues the study.

THE CHILDREN who were born in 1914 are entering the junior high school in 1927. The 100,000 who greeted me with their astonishing laughs, answers, and essays in 1926, were in the early years of their babyhood throughout the fateful period from 1914 to 1919. No generation of children in all the world's history has ever seen such a babyhood, when all the world was laughing at and tearing to pieces every material and ethical idea the race had ever evolved. What stories, what pictures, what emotions were those first impressed upon their waking intelligences! All they may now think or say or do is gentle civility compared to what their elders were at in those years.

Those who were children six years old entering school in 1914, are being graduated in 1927; they are the seniors and juniors who wrote the ten thousand essays in my possession. They passed a youth amidst an agitation of all important questions—economic, political, social, religious—the most turbulent, the most vividly presented, and the most widely disseminated of all time. The youth of whom Stanley High speaks in "The Revolt of Youth," were then, from 1914 to 1919, beyond the ages of the high school students involved in this discussion, so that what he describes is not the revolt of youth but the reaction of maturity. The real fruitage of those years of war and reconstruction from 1914 to the present is found in the thinking of the youth in our high schools.

The keynote of this study is the question: "What are you going to be?" We doubt if any other question can awaken in all youth so keen an interest or correlate

so many subjects of general concern. It has revealed an elemental failure of parents to advise their children on life work, 60 per cent. of the children questioned stating that they have never had a serious talk with their parents on the subject; and of those parents who had given advice, only *one in forty* had encouraged his children to take up his own work, while 93 per cent. had advised against it; and 51 per cent. had supplemented this position by advising their children to seek an *easier life*. We have found in the schools a great lack of interest in productive occupations, especially in farming, and in detail we have followed the laugh at the farmer and farming across the great agricultural belt in the center of the Republic, particularly in New Jersey, Pennsylvania, Maryland, Kentucky, Ohio, and Kansas—reaching its most striking illustration in Kansas, for there, in communities representing 10 per cent. of the population of the state and in high schools in which 70 per cent. of the students had parents of farm origin, only twelve students indicated farming as their life work.

But if farmer boys and girls are seeking ways out of the work of the fathers, so are the children of the other producers—the miners, foresters, lumbermen, and fishermen. In the Pittsburgh district, extending from Oil City on the north to McKeesport on the south, in high schools representing 15,000 students, there were fewer than 10 who had thought of finding life work in the coal, iron, gas, oil, and coke industries or in mining in any of its departments, and in all the schools reviewed there were but 66; of those interested in forestry or lumbering in any way, there were 129, and in fisheries there were 9. Thus, including the 153 future farmers in the four great productive industries—agriculture, mining, lumbering, and fisheries—there was a total of 357, which represents a turning away from the origins and industries of their parents of more than 99 per cent. of the children.

In the different fields of "manipulators of material things," that is, of all kinds of "makers," from locomotives to lip sticks, from houses to hats; of all kinds of "carriers," from brakemen and air men to boat owners and railway presidents; of all kinds of traders and sellers of things, from ribbons to real estate, and of all kinds of financiers, bankers, stock brokers, insurance and credit men—the students showed greater interest and larger figures were obtained. I had expected to find among the students great interest in manufacturing in manufacturing towns, in oil in oil towns, in steel in steel towns, and so on; while in these there was closer relation between the occupational interests of the community and the choices of the children, even in these the numbers who thought of following the vocations of their parents were extremely low.

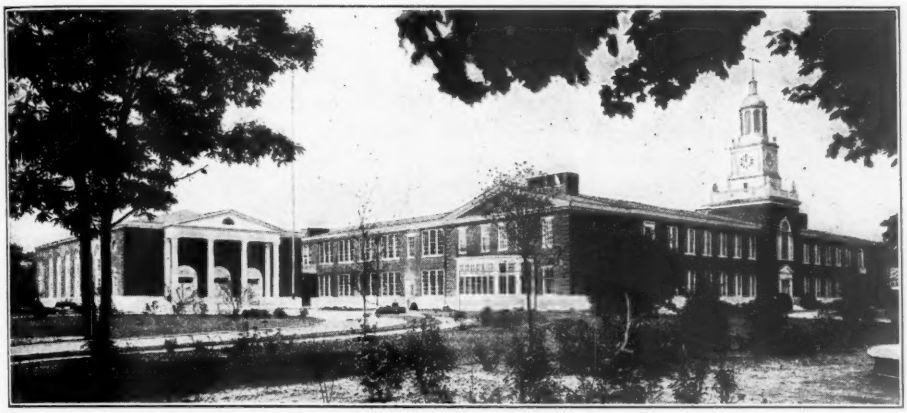
Trenton, New Jersey, and Chester, Pennsylvania, are distinctly manufacturing towns; everybody knows their slogans, "What Trenton makes the world takes," and "What Chester makes, makes Chester"; in these cities, where many of the plants are new and in architecture and structure are as perfect and attractive as science and engineering can make them, one would expect to find great numbers of children preparing to take some place in the processes of manufacturing. In Trenton, in the senior high school of 1,200 students, there were only 15 who were doing so; in a junior high, 900 students of the tenth year, a group of unsurpassed uniformity of ability and brilliancy, none had yet chosen such a vocation; in Chester, in an assembly of 400 senior high students, there were 16. In McKeesport, Pennsylvania, with a population of 50,000, the home of great steel, tin, and tube works, of 1,000 students in the assembly 2 had chosen to be miners, 150 to enter some manufacturing line, 10 transportation, 1 finance, and 70 merchandizing.

In this group of vocations—makers, carriers, sellers, financiers—the closest correspondence between the work of the parents and the choices of the children was found in the field of finance, indicating that there is greater satisfaction with work among parents in this field than in any other and that apparently a larger proportion are advising their children to follow in their footsteps. The number who

indicated that they would enter the financial field was so small in each high school that it was possible to note that the children who said that their parents were in this field, were the same children who said they were to enter it.

In West Chester, Pennsylvania, six students had parents in finance and the same number said they would enter it. In Peddie Institute, Hightstown, New Jersey, a private college preparatory school of 300 boys drawn from thirty states, there were 33 who had parents in financial lines and 32 who indicated that they would enter them. In the six high schools of Washington, D. C., 100 reported parents in financial lines, 81 of whom indicated their intentions to enter such pursuits, thus showing what this tendency is in all the high schools of a great city. The total of all schools surveyed reported 651 parents who were bankers and the like, and 473 students who intended to enter that line, or about 70 per cent. These facts seem to establish confidence in the general accuracy with which these students were reporting on the whole subject in regard to both themselves and their parents.

The summary of "manipulators of material things" for 54,410 students is as follows: "makers," parents engaged 4,081, children choosing such vocations 1,481; the "carriers," parents 1,685, children 504; "sellers," parents 3,785, children 1,229; "financiers," parents 651, children 473; total parents in these lines 10,202, and children choosing them 3,687—thus showing in each division of these vocations as well as in the total, that the number of children who are thinking of entering them is about *one third* of the number of parents so engaged. This is a change of 67 per cent.



AN ENVIRONMENT THAT MOULDS GOOD CITIZENS

The Colonial style of architecture is particularly appropriate for a Trenton, New Jersey, high school. In such an atmosphere one usually finds a greater measure of respect for American ideals and institutions.

Leaving now the field of the workers in material things and stepping up into the second class—those that deal with man himself, in which we find those vocations which include what long have been known as the "professions"—we notice at once a great increase in the numbers of children who look forward to entering them. For instance, there are twice as many children expecting to enter these vocations as to enter all the lines of producing and handling material things—that is, twice as many as there are farmers, miners, lumberman, fishermen, manufacturers, builders, carriers, merchants, and financiers; and the ratio between the number of parents in these vocations and the children choosing them is multiplied by twelve, for instead of being one third as many children as parents there are four times as many.

The first division of those who deal with man—physical caretakers—was classified as follows to indicate something of the na-

ture of our civilization: (1) those who feed us—cooks, chefs, caterers; (2) those who develop us—athletic trainers, coaches, gymnasts; (3) those who work upon the appearance—barbers, manicurists, the beauty parlor lady; (4) the healers—doctors, dentists, masseurs. There were 1,960 students expecting to enter these lines, twice the number of parents in them. The relative numbers in boys' schools and girls' schools were about the same, being 5 per cent. in case of the boys' and 6 per cent. in case of the girls'.

The second division—those who deal with the mind of man—includes (1) teachers, textbook makers, librarians, the fields of journalism and authorship, that train and furnish the mind with material; (2) those in drama, moving pictures, and amusements, that entertain the mind. Here we found 4,633 students, or nearly 9 per cent. of those questioned, a number six times as many as have parents in these lines. The greater number of these were girls entering the field of teaching. In five girls' schools, numbering 5,425, there were 1,280 who signified their intention of becoming teachers, or 24 per cent.; in contrast, in five boys' schools numbering 3,990, there were only 262, or about 7 per cent. The relation between the number of children and the number of parents was seven to one, an increase of almost double the ratio in the preceding division of this class.

The Laugh at the Minister

The third division comprises those who take care of the spiritual and moral natures of man, the principal of whom is the minister. "How many of you have chosen the ministry as your life work?" When this question was asked, the students had been thinking seriously and answering seriously upon the foregoing study. The transformation was instantaneous, and the second of the three great laughs was given, and students looked about to see who would raise a hand. The situation so produced was so delicate that in only 12 instances out of 92 high schools did I think it safe or wise to ask: "How many children present have parents who are ministers?"

Believing in the work for which the church was instituted and having always given full support to ministers, although it was not the purpose of my address to preach to the students, I called their attention to the fact that this was the second question in the list that had called forth their laughter and their curiosity—the first for the farmer, the second for the minister—and stated:

"The world needs and must always have spiritual leaders. I give you this tip on the future: If the youth of America undertake to do without spiritual and ethical leaders, long before you are as old as I am, you will have made such a failure of your generation, and will have such disorder, crime, and unhappiness among you that those who are then prepared to be spiritual leaders to lift the world out of that condition, will have three things: the greatest opportunity, the greatest honor, and the greatest pay, if they demand it, of any profession then existing."

I then asked the question again, enumerating as spiritual leaders ministers, missionaries, deaconesses, sisters of charity, Y. M. C. A., Y. W. C. A., and Boy Scout leaders; this resulted in a larger showing of hands.

The number of whom this question was asked was 89,000 students, in 86 schools.

The total number of which detailed record was made was 60 schools and 49,082 students.

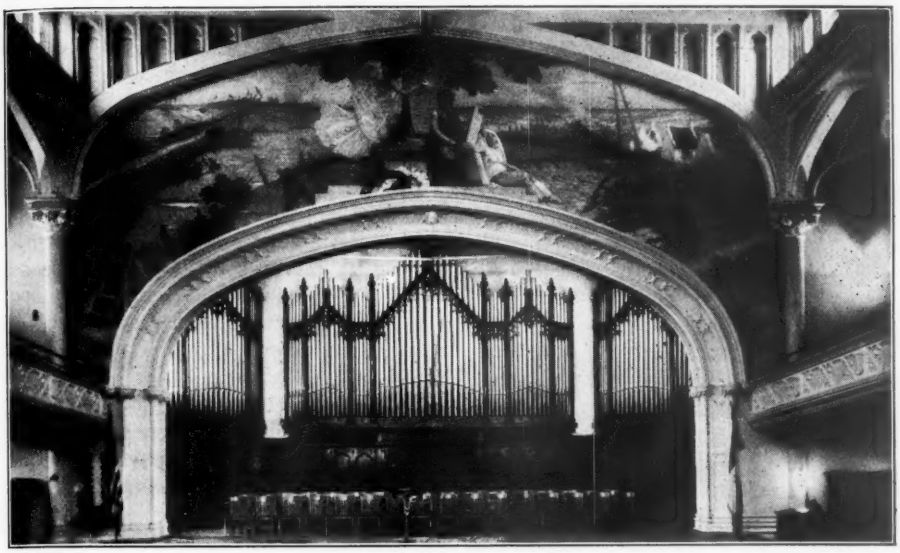
Of these sixty schools there were 13 in which no hands at all were raised in answer to the question.

Of the 55 schools in which there were boys, there were 34 in which no boys raised hands.

Of the 55 schools in which there were girls, there were 23 in which no girls raised hands.

Of the five boys' schools, enumerating 3,990 in the assemblies, there were three in which no hands were raised, and in the other two there were 9, of whom 7 were Jewish: 1 to every 444 boys.

Of the five girls' schools, enumerating 5,425 girls, there was one in which no hands were raised, and in the other four there were 14: 1 to every 400 girls.



"AFTER CONFLICT COMES PEACE," BY AUGUSTE FRANÇOIS GORGUET

The inspiration from good murals is self-evident in schools fortunate enough to possess them. The painting above the proscenium in the auditorium of the Morris High School, New York City, means much to the community because of the sacrifices involved on the part of students and teachers throughout a period of six years in saving funds to obtain it.

The largest number in any one school was in Lexington, Kentucky, where out of 590 present there were 20, 6 boys and 14 girls. The next largest was in Louisville, Kentucky, where in a girls' school of 1,000 there were 7.

The total number who raised their hands was 139 students. There were 48 boys in all, or 1 boy for approximately every 1,000 students, and 91 girls, or 1 girl for every 540 students; or taken together, one religious worker for every 432 students.

Why this laugh at ministers and why this small number of students whose thoughts tend to spiritual work? It is probable that no answer acceptable to all the people concerned will ever be given to that question because the viewpoints and the interests of religionists and non-religionists are so antagonistic that what satisfies the one will not please the other; for at the beginning we must note that only 40 per cent. of the people of the United States (1924) are church members —this includes all Jewish, Catholic, Protestant, and independent churches of every kind—and 60 per cent. have no church connections at all. No doubt these percentages are reflected in the attitudes of our youth so that a very large percentage of them look upon ministers as an unnecessary social factor, a position which they find tenable since churches and religions have thrived and have developed citizens of the highest intelligence and character without having had ministers as an essential factor.

Upon one thing, however, we can agree, that the tendency in young America to laugh at ministers and the ministry is revolutionary; further, that it is not accidental and that those responsible for it are those who constitute the religious element in the country; that the laugh is not against the rank and file of church members, but against their leaders. What have the ministers been doing to reverse the exaltation formerly accorded them by the rank and file of youth, to one of indifference, rejection, and ridicule? The answer follows:

First, the laugh is not due to a lack of moral or spiritual quality. The high school age is the age of idealism and hero wor-

ship; it is the age when individuals seek ideals, formulate them, are more susceptible to their influence, and are living upon the inspiration which they derive from them more than at any other period of their lives. Just emerging from the period of the fairy tale, faith in the existence and power of the unseen is at its maximum. Their intuitive reverence for God and religious practice has not diminished now but is profound and impressive. Many of these high school assemblies were opened with reading the Bible (in some states that is compulsory under law), followed by the Lord's Prayer repeated by all. In many schools these devotions are conducted by the students themselves. I have never seen compliance, sincerity, and reverence in worship in equal degree anywhere; if religion can germinate no seed and find no root in such soil, it is not the fault of the soil. There is nothing wrong with the religious spirit of our youth, and no decadence in the high schools of this country. Yet from these same students, in this atmosphere, came a few minutes later the reaction and the statistics I have just noted.

Second, the high school youth are not responsible for the social practices of the time; they have been obliged to accept the universe as it was handed to them when they were born. They have not created one of the devices ("inventions of the devil," as a Los Angeles minister called them when railing against public schools, in January of the present year) which are cited by ministers and moralists as evidence of youthful turpitude. They have not written or commercialized a vulgar song, or a seductive jazz tune, have not devised a voluptuous dance or written an indecent play, or made a hideous movie, or designed any visible trade-mark of the flapper with diaphanous dress which covers a third of her stature. Hence, these ministerial assaults on high school youth appear to them illogical, unjust, and ridiculous.

Third, with the exception of the heads of a few schools, mostly private schools, and a few negative-minded speakers before women's clubs, the attacks upon the morals of high school boys and girls are being made by ministers and ministers only. This is folly and tactical error of the first magnitude on their part. No young person can be on confidential terms with a minister of the blood-and-thunder denunciatory type. The attributes that draw children to parents and men to ministers are understanding, sympathy, and a gentle tongue; a minister without these has no appeal and no influence with the young and his preachment negatives his claim of the gentle power of divine love. Since ministers denounce youth for living under conditions which they did not create and charge them with intentions and sins of which they know themselves innocent, the ministers must expect retaliation, and they are receiving it in ridicule.

Fourth, boys and girls to-day refuse, on entering a church, to leave their intellects on the outside. During five days of the week they trust the intellect as a life guide and revel in the joys of its exercise. The high school teacher of to-day does not ask his students to accept his dictum *ex cathedra*, but to prove all things and to hold fast to that which is good. With these students the day of ministerial dictum is dead. In church, as well as in school, students must have facts, detail, evidence, reasons, logic, organization of matter, proof, conclusion; without these, pulpit fulminations are worse than nothing; faith in the minister and his statements are interdependent.

Fifth, these high school students are far advanced mentally. My personal experience with nearly 100,000 of them within a year, and the remarkable quality and insight revealed in their written statements, convince me that their elders are underestimating high school ability to sit in judgment upon the best discourses that can be delivered by the best ministers, statesmen, scholars, and scientists of the time. This opinion is supported by the experiment in the high schools of Pittsburgh conducted by the Henry C. Frick Educational Commission in 1925-26. There, to 10,000 students, five experienced lecturers, each a scholar and artist of national fame in his line, delivered ad-

dresses under the lofty general subject: "Beauty and the Fine Arts," a study of beauty in relation to sculpture, line and color, poetry, literature, and culture of the spirit. The students were required to write reports upon these addresses, criticizing the personality, the special technique, and the ability of each speaker. A critical study of these essays was made by the commission, and from their report I quote the following sentences:

Of 2,161 of these essays, 218 pupils stated with the most surprising and delightful frankness their expectation of being *bored* by the addresses, and that from many previous experiences they entered the auditorium in various degrees of distrust and dislike. 288 spoke, with almost uncanny degree and directness of perception, of the personality of the various artists. How they managed to secure and assimilate so complete an impression in so short a time is little less than marvelous. 580 spoke with the utmost discernment of various technical excellences in the addresses. 525 emphasized various philosophical comments made by the different artists; a large number added wise comments of their own, many of which in their originality and depth are as surprising, as interesting, and as valuable as they are unexpected. 586 made criticisms with frankness and entire truthful sincerity, and in very many instances their criticisms were perfectly just and extremely valuable to all those who are attempting the extremely difficult task of finding some way of *making the experience and wisdom of Age acceptable rather than repulsive to Youth.*

Ministers who fail to pass the mentality test set up by the trained, informed, penetrating perception of these youth, bring their whole profession into discredit. The thousands of pulpiteers who are highly capable of satisfying and leading the intellect of youth, together with their congregations, bear the deep responsibility of training or eliminating those who are not. There are preachers occupying pulpits, some of them even in our most populous centers, who know less of English, of history, of science, of current events, of the art of presenting their ideas, who have less mental training and less culture than have the upper classes in high schools; and it does not take the latter long to discover that.

MURALS DIRECT YOUTHFUL IMAGINATIONS
Explorers in Saskatchewan "listening in"—a mural intended to show elimination of time and distance, painted for the Eastern District High School, Brooklyn, by F. L. Stoddard.

One day a high school senior, a member of the church where he had just listened to a sermon by one of these intellectual sixth-graders, said to me: "Well, that man means all right, but he just hasn't got it in the bean." How, then, can such ministers meet the exactions of college and university students, many of whom at the ages of twenty-one are graduated after fifteen years of well-directed, intensive, mental discipline? With these students, intellectual ability is the criterion upon which they base their respect. When a minister fails there and frankly discounts the intellect and ridicules those who accept its guidance, as many of them do, they themselves appear ridiculous to students.

Sixth, upon this brilliant youthful men-

tal retina the current controversies between churchmen appear in dark and ludicrous forms. Religion is the open, free-for-all subject of the time; it had its field day of front-page publicity and universal discussion in the Scopes' trial in Dayton, Tennessee, in the unfortunate wrangle and division upon the subject of fundamentalism and modernism. This fight is totally and exclusively a ministerial fight; it is repudiated by the laymen of all churches, who are crying out: "Let us alone, let us have peace." The hopeful signs of the times are the efforts to eliminate creeds, to level denominational walls, to find unity in purpose and practice instead of in verbal profession of tests of faith, stupid and centuries old.

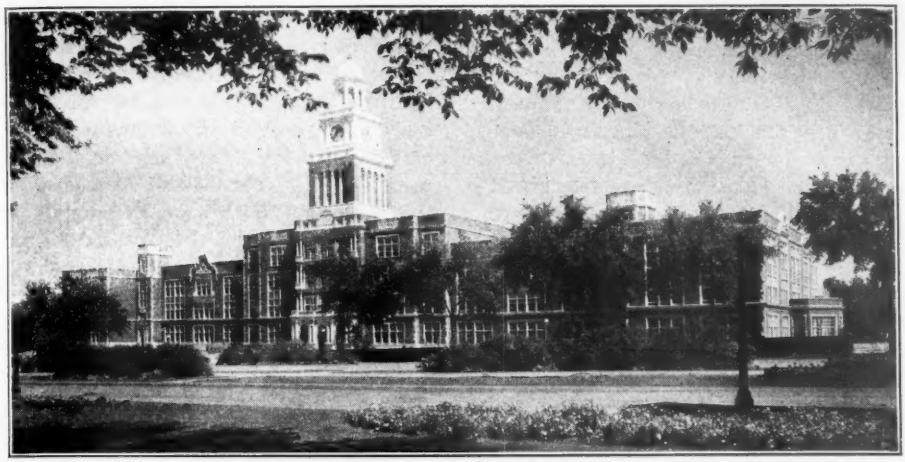
The youth of the high schools set their own experience against these ministerial quarrels; they see no difference of mental action or emotion in the different religions represented in the sects about them. They perceive that all the academic disputes upon which the world has been split into a thousand different ways of worshipping God, constitute the most colossal and ridiculous folly of man. They feel what laymen of all churches know, that these disputes and these divisions are created and perpetuated by the ecclesiastical imperialists of the churches. The demands heard from pulpits for world peace and unity of political action on the one hand, contradicted by universal fight and division of religious groups on the other, justify the attitude of disinterest which the high school youth exhibit toward those who make the demands. Their laugh is the challenge which intelligence makes to bigotry.

A very high percentage, 2,283 students out of 48,680, or sixteen times as many as responded affirmatively to religious fields, stated that they would enter æsthetic fields—music, poetry, painting, sculpture, architecture, designing, and decorative art. This is one of the greatest changes wrought in youthful thought by the enlarged curricula of the schools. Twenty years ago, students of equal advancement in regular studies would scarcely have understood the meaning of this classification. New high school buildings, highly artistic without and within, in the aggregate an outstanding national achievement impressive to all visitors from other nations; the development of courses in art, courses in instrumental music, with organization of bands and orchestras—these have given our youth a new outlook upon life enterprises. They have made a deep impression upon manners and conduct; it may have been a series of coincidences, but I found the best manners and finest spirit in the most beautiful buildings and most æsthetic environment, and the worst in the most unattractive.

The percentage to enter the æsthetic vocations is three times as great in girls' schools as in boys' schools, and much higher in schools with fine buildings, art courses, and music than in those without them. The highest percentage was found in Cincinnati, where now, as for two generations, music, art, and drama are a passion and prime interest of the whole city; where school buildings are splendid in architecture and interior decoration. There the radio was $8\frac{1}{3}$ per cent. of all pupils, or double that for all the schools included in this summary. It might appear invidious to name the city where it was the lowest; but it is a large city, an old city, where the æsthetic side of school life has had little encouragement in fine buildings and in fine, large assembly rooms with beautiful appointments; where few good pictures are seen in rooms and corridors, and musical organizations among the students are not far advanced.

"Third Class Clerks From First Class Farmers"

All these vocations from producers of materials to cultural leaders arrange themselves in horizontal strata, but from the bottom to the top there are certain workers required by all of them; we may call these the "helpers"—the stenographers, typists, bookkeepers, clerks, secretaries, and assistants, who figuratively are the steel that runs through them all, binds them all together, and makes the great wheels line up and go round. These have



A SCHOOL THAT TEACHES BEAUTY

Denver's East High School, built in the English Jacobean style, is said to be America's most beautiful high school. It faces on the city's famous Esplanade.

the advantage of choosing their places anywhere in the social structure and, if one place is not satisfactory, they can find another without learning a new art or trade or skill. As this is the easiest and quickest way to self-support we shall expect the numbers to be large.

There were 6,696 students out of 50,200, who had chosen this field, or 14 per cent. of all; this is nineteen times as many as all producers combined, twice as many as makers, carriers, sellers, and financiers combined, and four fifths as many as all who deal with man in his physical, mental, spiritual, and æsthetic aspects. The numbers tallied accurately with the size, kind, and composition of the schools, reaching the highest numbers among children of workingmen, and the lowest in select and private schools. In business high schools the number ran consistently at 50 per cent. of all present, and in college preparatory schools it was less than 1 per cent.; in one boys' preparatory school of 750 there were none at all. In girls' schools the percentage was 30, in boys' it was 3.

In distinctly agricultural communities this line seems to offer a wide door out of farming, as the number ranged from 7 per cent. to 26 per cent. of those present, which was from seventy to eighty times as many as indicated that they would be farmers. In one high school of more than 1,000 in a fine farming country 30 per cent. said they would enter this line, or forty times as many as would be farmers, or as many as had chosen all other vocations combined. This is easily interpreted by those who were reared on the farm when they recall how little they knew about other kinds of life, how fearful they were to risk anything greater than being a store clerk, a stenographer, or a country school teacher. These high percentages give countenance to the complaints of many farmers against the emasculating influence of the high schools voiced by a Maryland farmer thus: "These high schools are spoiling thousands of first class farmers to make third class clerks out of them."

Science has created a new vocation which, like the helper, plays a part in all the others; let us call this the "developer," whose aim is to improve man and his machines and to refine every process of life and work. He may be trying to develop a finer microscope to reveal the minute structure of the blood in a search for a cure for cancer; or he may be working on new instruments and experiments to measure reactions of the nervous system to emotional stimuli; he may be applying new discoveries in chemistry to making and running automobiles, or to getting nitrate

out of the air to fertilize cotton fields—the Burbanks, Edisons, Marconis, Fords. This is the field of highest intelligence and closest application and is permeated by a new religion, the religion of fidelity to duty in pursuit of knowledge to better man's life. Theodore Roosevelt called it "the spirit of consecration in scientific research."

This subject, more than any other, revealed the influence of teachers and of local environment upon children. Schools are made by their teachers, and high schools, both teachers and students, by the principal. Like principal, like school, is the brief summary of my whole experience. In some schools it was apparent that this subject had never risen into their mental horizon; though daily the press reports or prophesies epochal revelations about matter and mind which furnish the basis for the most interesting current discussions, in such schools my question on this subject was like a look into the night. In other schools the response to it was made as familiarly as to any other. Affirmative answers were given by 528, or 1 per cent. of all students questioned; these were almost wholly boys, the number of girls who thought of doing such work was negligible; in 70 per cent. of all the schools no girls at all responded, and in the boys' schools the percentage of boys who responded was twenty times that in girls' schools. Though our present scientific structure was built almost wholly by men, there is no reason, at least none that women will admit, that it should remain so. But if woman wants to go to the top here, she must put the idea into the mind of her daughter. If she can turn her alleged natural feminine curiosity into some practical account in scientific research, she may stand to eclipse everything man has done.

The numbers preparing for this work varied greatly according to local influences; in the Pittsburgh district, the birthplace of new processes especially in manufacture of glass and steel which have revolutionized construction, this number in Peabody High School was 2 per cent.; in McKeesport, home of glass, steel, and tube works, it was 3 per cent. It was lowest in agricultural states, low in Ohio and other partly farming and partly manufacturing states, and it was highest where we should expect to find it, in the schools of Washington, D. C., where the government is the greatest research agency in the world, and where so many parents are in that work. There the Technical High School, in which 4 per cent. of the students propose to enter the field of research, outranks every other of the 91 schools I saw, and Central High is a close second.

The Laugh at the Politician

"Over all these vocations and equally distributed everywhere is that of the politician. How many of you are going into politics?" This question brought instantly the most derisive of the three great laughs. In it there was repudiation of the politician, scorn for any one who might raise his hand, and rejection of the whole idea. A few raised hands in jest and spirit of bravado which they wished all to see and understand; for this reason statistics would be valueless, and no inquiry was made as to the number of parents in this field. For youth are especially sensitive about reflections upon the social position of their families; for this reason no data was taken in regard to parents in religious work; in the case of the farmer, in which full inquiry was made about the number of parents who came from the country, it was deferred until the laugh was forgotten and the students were impressed with the essential contribution of agriculture to life, and they answered freely.

American youth are firmly established in their utter contempt for politicians. Here they feel there is one man for whom no defense can be made, for he rides brazenly and rough-shod over all their ideals, and many expressed themselves freely in written reports after this manner: "Notwithstanding what Mr. Flowers said about politics, I will have nothing to do with politics; it is a degraded and crooked business; politics are run by crooks."

The defense which I made of the politician in an explanation of the meaning

and function of politics, however, brought many statements like these: "I was mistaken"; "I never understood politics in this light before." This defense and explanation counters the mental attitude of millions of Americans who are much older than these youth, and is given in part here as I gave it to these students:

"This is the third vocation at which young students all over America are laughing, and in each case you have laughed because of your misconception of the necessity and the values of these vocations. What is politics? Politics is the science of government. If we have government we must have officers; if we have officers we must have elections and candidates and the right kind of voters to elect them. For whoever are elected constitute the government and the government determines the general conditions under which you all work, no matter what vocation you choose. The government by the turn of its hand can put you into work and out of work; it can make your wages fifty cents or one dollar; any one who laughs at the politician or political activity is mocking his own welfare; we have come to a time in world economics in which the government has more to do in determining the standard of living than any other agency, sometimes more than all other agencies.

"The standard of living of a country measures the return of labor in terms of human happiness. The standard of living of the United States into which you were fortunate enough to be born is the highest standard of living in the world; it is the richest legacy you have received out of the past and the most precious possession you have to guard in the future. The only place where you can work effectively to this great end is in politics.

"Politics and government are the only fields in which you can continue your school spirit of faith in one another and your team work; here each of you may work for all and all of you for each one. By team work you may have whatever kind of government you desire and whatever conditions of happiness you desire in every kind of vocation. And if you do not form the personnel of the government, then those of lower ideals, less character, and less preparation will form it. You are greatly needed; it is a new era in politics, the time requires the highest types of men to represent the people in every phase of government at home, and to represent the United States in every nook and corner in the world as ambassadors, consuls, and government agents. These constitute a true profession and all great nations recognize it as such.

"As the unity of all the nations in leagues, councils, and courts becomes more and more an accomplished fact, in which the trained experts of all governments of the world sit, the highest types of intelligence, that come only from long preparation and continued service, will be required. In these councils all the interests of our nation are at stake—all peace, all prosperity, at home and abroad. Some of you must find places here. For no service, no satisfaction, no thrill of life will be so sweet as those you will get out of beneficent leadership of your fellowmen.

"Therefore, whatever your vocation may be, lay down beside it and parallel to it as your avocation for life, full activity in politics and government. And after you have learned the game and when your time comes, step right out and say: 'I am a candidate. I can be a member of the board of education, or mayor, or Congressman, or Governor, or President. I seek the office because I have a program and these are my principles and my reasons for them.' Then roll up your sleeves, muster your friends, and go after the office with a mighty effort. This is not egotism, it is absolutely essential to freedom. And let all who have ever felt the spirit of these schools and have received its benefits as the gift of the government, rally to those of your own number in whose capacity and honesty you have faith."

Putting a Heart Into a Public Utility

An Interview Given to M. S. Rukeyser by

MATTHEW S. SLOAN
PRESIDENT OF THE BROOKLYN EDISON COMPANY

Here is a public utility which actually hunts ways to cut its rates. A few years ago that would have seemed incredible, but it is not unusual under the modern order of conducting business. A few months ago the WORLD'S WORK *started telling the story of "The New Leadership of Business," which included also telling of an entirely new spirit and order in big business, and the interview with Mr. Sloan continues that series. His methods are helping to remold the philosophy of the public utility field.*

IT IS NECESSARY in this world not only to do good work, but to have it recognized for good work, and to have it appreciated at its real value, if there is to be opportunity to carry on and extend the work. The true value of the public service rendered by our industry—by all the public utilities, for we are not alone in this situation—is not appreciated because we as an industry have failed to give proper attention to the very important element of human nature as it affects our companies and our industry.

We have not made friends of the public. It isn't that we as companies or as an industry have been unfriendly, or have wanted even to seem unfriendly. The job of furnishing service has been so big that we have given all our energies to that—forgetting that the public is our boss and, as our boss, is entitled to know what we're doing, and how, and why. We haven't been reporting. Consequently, our boss sees certain results, but doesn't understand just what they represent and what they mean.

The answer is to get right with the public—to take up the human relations in a human way—to make the public know we seek friendly relations, based on a community of interests and on mutual dependence, mutual duties, mutual obligations.

In our dealings with customers we try to impress them with the fact that the company is a collection of human beings who are readily accessible. In advertising in newspapers and in folders enclosed with the monthly bills we invite complaints. I find that most complaints from customers are warranted. As soon as I receive a complaint, it is immediately acknowledged and the customer advised that an investigation will be made promptly. When the investigation is complete, within twenty-four hours, a representative calls on the customer to explain the entire transaction or question in dispute. After the representative calls on the customer, a report of the matter is returned to my office, and a letter is sent to the customer asking if everything has been adjusted to his satisfaction. Usually it has been. This expression of personal interest by the chief executive is our tangible way of showing our customers that we want to serve them well. Our patrons appreciate the fact that the channels of communication and contact with the executives of our company are open, and that their letters have not been pigeon-holed or ignored.

There is evidence that these efforts have resulted in a new understanding between the public and the company. In this period we have never had a rate case in the courts, and I hope and believe that we never shall have one. Our complaints are comparatively few. A recent announcement requesting complaints which ran in periodicals of an aggregate circulation of 1,500,000, brought only eight replies. There is a considerable volume, both verbal and written, of commendation

Airview by Airmap Corporation of America

THE SITE OF THE LARGEST STEAM TURBO-GENERATOR

Brooklyn lies in the foreground, the four gigantic stacks of the Hudson Avenue generating station of the Brooklyn Edison Company rising on the shore of the East River. Beyond, the huge span of Williamsburg Bridge links the borough with Manhattan. At the right of the station is the Brooklyn Navy Yard.

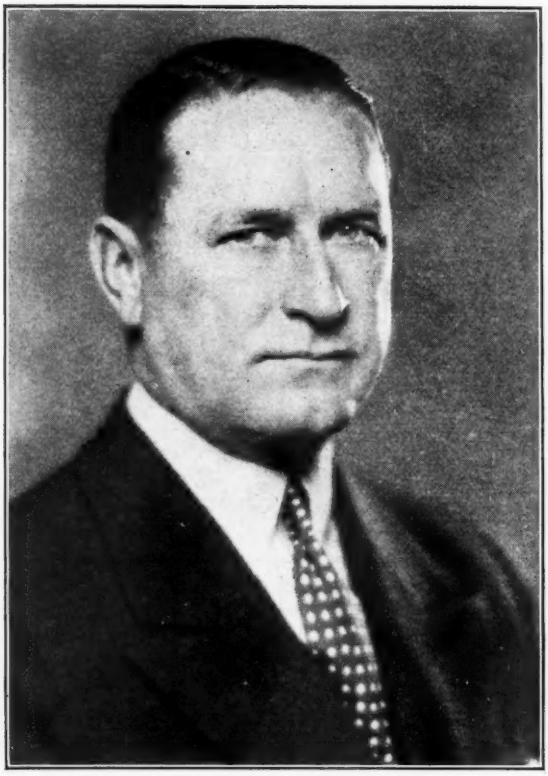
of our company's performance and particularly of its frankness.

Our course is based on the belief that the public has a definite interest in the company—a partnership with the owners of its securities, if you please; since the company holds its charter from the public and is enabled to carry on its business by reason of certain grants and privileges to use public property, for which, of course, due payment is made. There rests on us, therefore, the obligation always to consider carefully the interests of the public-partners as well as the stockholder-partners; and the necessity to show by deed and word that we are doing so.

I do not expect to live long enough to see the time when there won't be somebody expressing dissatisfaction with the best utility company on earth. Nevertheless, it is perfectly possible for the public utility to shape its policies and its practices so that it may have and hold the good opinion of the very large majority of its public.

I believe public utility executives should sit behind the desk less and stand on the platform or at the luncheon-table more. There has been too much private-office and brass-grill atmosphere about the utilities. The public doesn't understand it; the public doesn't like it; and there's no reason for it. The more we mix with people, the more contacts we have with them, the more they know us as human beings they have seen and talked to or listened to, the less suspicion they will have and the less antagonism they will feel toward the companies we represent. If they know Bill Jones as a decent fellow, trying hard to do a good job for the company he works with and the public it serves, they don't think of Bill Jones as a hireling of some mysterious gang of looters.

The chief executive, as spokesman for his company, should not limit this function to stressing the accomplishments and good work of the enterprise. The president should give the public all the facts which may in any way affect their interests. Recently, in reply to inquiries from reporters, I denied a series of false rumors which were being circulated during an attempt of a pool to boost the price of our company's stock. I realized that, if I remained silent, many individuals would accept the baseless rumors as facts and that



MATTHEW S. SLOAN

Born in Mobile, Albama, on September 5, 1881, Mr. Sloan has spent virtually his entire business career in the public utility field. Graduating from Alabama Polytechnic Institute in 1901, he developed into a construction engineer with the General Electric Company at Schenectady. Starting in 1906 as chief engineer of the Birmingham Railway Light & Power Company, by 1913 he had climbed to assistant to the president. Four years as vice-president and general manager of the New Orleans Railway & Light Company prepared the way to his becoming assistant to the vice-president and general manager of the New York Edison Company and, in 1919, president of the Brooklyn Edison Company.

He has watched Brooklyn's unprecedented growth in the intervening years, seen the 142,000 meters of his company grow to more than 650,000, and an annual gross revenue of $9,000,000 mount to more than $35,000,000.

as a result many small investors would involve themselves in commitments which might ultimately result in substantial losses. Not wishing to become a party to this attempt at wholesale deception of the public, I issued under my signature a categorical denial of all these false rumors.

I do not want our stock to become a football of speculators. I wish it to be looked upon as what it is—a stable investment issue whose value is dependent on the earning power of the company. The price of the stock, I recognize, must, like that of all other issues, also reflect to some extent prevailing interest rates and general financial conditions. As an investment I buy our stock and add to my holdings as I can, but I do not trade in the stock of the company and would not knowingly permit any member of our organization to do so.

Good public relations do not depend on overstating the virtues of a corporation, but on calling attention to good work done. The question which most commonly causes friction between consumers and public utility companies is that of rates. We have no trouble whatsoever with the people of Brooklyn in regard to charges because they know, I believe, that it is our policy to give them the benefit of any substantial savings in the cost of operation realized from improved methods and from quantity production of power.

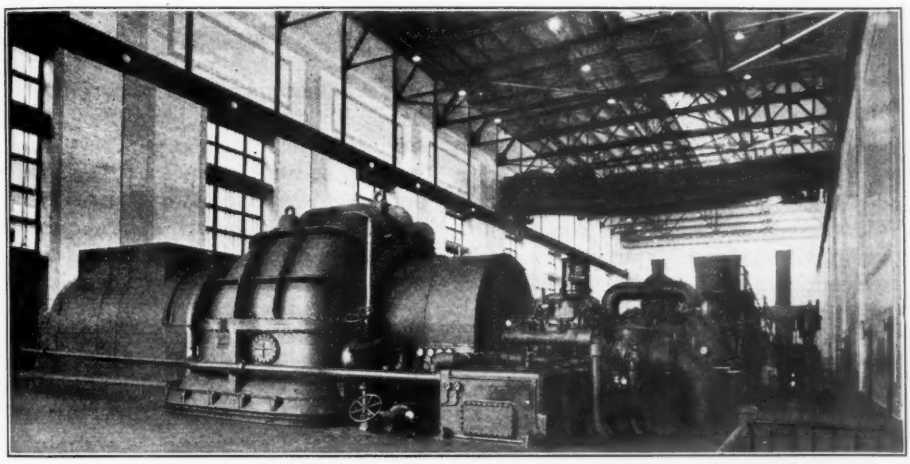
We demonstrated our attitude in this matter by announcing a series of voluntary rate reductions. On January 1st of this year, we reduced the rate for electric service to the people of Brooklyn from $7\frac{1}{2}$ cts. to 7 cts. a kilowatt hour. Two years previously, we made a similar cut in rate, that time from 8 to $7\frac{1}{2}$ cts. Two months earlier, when the company took over the electric business of the Flatbush Gas Company, we reduced the maximum rate in the Flatbush section from 9.8 cts. a kilowatt hour to 8 cts. By the end of 1927, these three voluntary reductions will have resulted in the saving of more than $5,000,000 for the people of Brooklyn. I hope these won't be the last

reductions in rates we shall be able to make. Whenever we can make savings which warrant a reduction with due regard to the future of the company as a business institution and a source of essential service which cannot be permitted to retrograde, that reduction will be made.

Our economies result from greater efficiency in burning coal (owing to the use of large economical turbine units), from quantity production, and from high efficiency in distribution and clerical office work. Not so long ago six pounds of coal were required to develop one kilowatt hour of electrical energy. Now, two and a quarter pounds of coal per kilowatt hour of electrical energy is about the average for all utilities in New York State. Our company is now able to produce a kilowatt hour with approximately one and one half pounds of coal. Incidentally, this significant countrywide increase in efficiency with which coal is transformed into electrical energy helps to explain the mystery of the shrinking consumption of coal, about which our coal producers have been so puzzled.

I feel that consumers as well as employees and stockholders should share the benefits that come from improvements in our art and the progressive economies which can be effected by enterprising management. I do not feel that such benefits should be made grudgingly, when public regulatory bodies or courts force it, but voluntarily and in a spirit of friendliness for the community served.

Although as a utility company we must deal with population in the mass, and not discriminate among individuals in respect to rates and character of service, we try to treat each case on its merits, instead of seeking to run our business on the basis of a few universal formulas. We believe that the customer is usually reasonable, and our aim is to give them precisely what they want. Moreover, we want our customers to realize that our corporation is not a cold, abstract thing, but a group of human beings. We wish to be friendly, pleasing, and courteous in all of our dealings. We recognize the value of prompt payment, and seek the coöperation of our patrons through explaining to them the need of doing our business on a cash basis, if we wish to keep expenses down and give our customers the benefit of low rates and high grade service. We explain that if payments are delayed the cost of operations will be enhanced. Such reasonable



Photograph by Amemya

THE LARGEST STEAM TURBO-GENERATOR IN THE WORLD

A part of the turbine room of the Hudson Avenue Generating Station, Brooklyn Edison Company, where 108,000 horsepower is developed for the use of Brooklyn industry.

statements not only make for good feeling, but are also more productive of results than the old-fashioned dunning letter.

I send a letter of welcome to each new customer as he is entered on our rolls. This letter, besides carrying a welcome, is a pledge of service, and a request for suggestions to improve the service. Many replies have been received to these letters, showing the interest and friendly feeling aroused by personal attention from the chief executive of the company.

We also try to develop cordial relations with our stockholders. I send a personal letter welcoming each new shareholder, no matter how few shares he may purchase. With the letter goes an annual report and an analysis of the financial condition of the company. Many individuals, in appreciation of this personal interest in them, have written to thank me. Quite frequently I send to all stockholders of the company copies of speeches I make before different organizations, because I think they ought to be informed as to the character of the individual who is in charge of the operation of their property.

We are adding customers at the rate of 100,000 a year and our growth in business reflects not only the growth of the district which we serve, but also an increasing disposition on the part of large industrial companies to give up their own power plants and use our service, because they can buy power cheaper than they can produce it. The trend of industries all over the country, except where steam is needed, is to give up their own plants and to buy power from companies specializing in and producing it. They are finding that it is better to release capital from power plants and to place it in activities more closely related to the profit-making objectives of the corporation. Not only is power obtained in this way cheaper, but it is also more dependable. The big central stations always have reserve units to avoid interruption to the service and are in increasing numbers interconnecting their power stations with power stations of neighboring companies.

Our chief contact for making friends with the public is through our employees. The enlightened corporation, thus, owes a direct responsibility to its employees. We pay as much attention to the human element in our service as we do to the mechanical element—more, in fact, because it is more important. Employees behind the generators and in our office mean more to the public than do the generators themselves. We use every possible endeavor to pick the highest type of employee for our personnel. Having found them, we encourage them and help them as much as we know how. If any person in our organization does not advance, it is his fault or her fault. We want all of our employees to be contented, happy, and prosperous for their own benefit, for the company's benefit, and for the public's benefit, as their health of body and mind is reflected in the quality of our service. We expect our employees to be promoted every six months. If an individual does not advance because he does not merit advancement, we shift him to another job. We have a school in our organization which any employee may attend without charge. It furnishes courses designed to train them in their work and to fit them for higher jobs with better pay. The courses range from instruction in the use of English right up to technical instruction, which is the equivalent of collegiate work. More than one third of our employees are enrolled in the various courses offered.

We have a profit-sharing plan which, beginning at the end of the second year of employment, gives to those who have been with the company five years the same rate of return on their salary as shareholders get on the par value of their stock. We do not consider this as a part of their salary but as an additional incentive, above the market rate for their services, to remain with our company. The Public Service Commission of New York has never objected to our profit-sharing plan. I presume its members recognize, as we do, that it increases the value of our employees in their work and thus heightens their efficiency and productivity. The plan is so popular with our employees that many are now partners in the company,

owning stock having a market value of approximately $2,000,000.

I believe thoroughly in the policy of regulation of utilities by public bodies. The establishment of state regulation of utility companies has been broad-minded and far-sighted statesmanship. It was needed at the time it was put into effect. It was needed for the benefit both of the utilities and of the public. It is still needed and always will be, just as courts are needed and will be until the millennium arrives. With this system operating, the public cannot be victimized by utility management, or made to suffer in service by any incompetent or negligent management. Neither can any utility honestly trying to do a good job be starved by a short-sighted community. There is a square deal for our industry and full protection for the public's interest, which is the way it should be.

Our accounts and expenditures and operations are rigorously supervised by the Public Service Commission, and I do not find that this regulation in any way hampers our initiative, enterprise, or capacity to develop and expand with the progress of the electrical art.

As a public utility we have no secrets. Anything in our past or present acts constitutes an open book into which the public may look. Our company lives, grows, and profits, and has its being by the grace of the public. We hold our charter and our franchise from the public. Our capital investment is the combined savings of thousands of individuals who own our stock, and many other thousands, policy-holders in great insurance companies which have purchased our bonds. Our revenue comes from the public, by reason of use of our service in homes, stores, offices, factories, places of amusement, public buildings, and on the streets of our community. Moreover, the operation of our company is supervised and regulated by the public through officials duly appointed for that purpose.

The law defines a public utility as a business or calling which is affected with a public interest. This sets it apart from other businesses or callings. It imposes on the public utility obligations which do not, in the same way or to the same degree, bear on other businesses. We have, and we acknowledge and accept, these obligations as an integral part of our business; and the degree to which we live up to them measures the success of our conduct of the business more truly, in my judgment, than does the strongest kind of a financial statement.

I am not underrating the importance of financial soundness and strength, either. It is necessary for a utility company to be solvent, sound, and prosperous, if it is to be able to do acceptably and well its job of serving the public and furthering the public's interest. Good public service cannot be furnished by a weak or starved agency, either in the public utility or in any other field. My point is, that the utility which most earnestly and consistently studies the public's interest and seeks, through its operations, to further the public's welfare will most surely work out its own success as a business concern.

That is the policy and the practice of our company. In a word, we endeavor to win success as a business by deserving it, both as a business and as an agency of public service. The law imposes on us the duty of furnishing safe and adequate electric service at fair and reasonable rates. It is our ambition and our constant effort to do a good deal more than that. I think no acceptable work can be done in this world without a certain infusion of idealism; and we are not ashamed to admit that we have ideals, and try to make them accomplishments. Our ideal is to sell our service at as low rates as we can, and still remain sound and prosperous financially, which is necessary if we are to furnish the highest possible grade of service. Our ideal is to operate so efficiently and economically and to sell our service so extensively that we can from time to time lower our rates, sharing with the public the advantages which our handling of the business brings to the company.

The more widespread ownership of public utility securities which has developed since the war is a healthy sign. Wall Street control, to whatever extent it

may have existed, is a thing of the past. We have Main Street control. We have among the utilities customer and employee ownership, which is by far a healthier thing than political ownership, or political management, which is what government ownership and management amounts to. Personally, I think that public ownership of public utilities is a dead issue in the United States. I have yet to find government furnishing, without subsidy, any form of utility service as good as such service from a privately owned company in fairly comparable conditions.

John Spargo certainly cannot be classed among the groups commonly termed "the interests." For many years he was the brains of the Socialist party in America, recognized even by those who didn't agree with his doctrines as a profound and able thinker. He recently wrote an article explaining why he no longer considered himself a Socialist, in which he declared that Socialism had been rendered obsolete by life.

"In the case of our public utilities," he said, "popular ownership has proceeded at such a rate that all schemes of nationalization or municipalization begin to appear antiquated, retrogressive and not progressive. As a means of attaining the greatest socialization of advantage, governmental ownership and operation of railroads, telegraphs, telephones, and similar public utilities now appear to me to be inherently inferior to the new type of enterprise we are so rapidly developing, characterized by popular ownership, representative management, and social regulation."

Progress for human betterment has been made and is steadily being made in our institution by evolution, not by revolution.

The public utilities have as their legal functions the production and sale of energy, fuel, transportation, communication. But they do far more than this. What they furnish for the public is greater ease and higher standards of living, more leisure, and greater happiness through increased comfort and time-saving in the home, through economies, efficiencies, and larger production in factories (which mean increased earning power), and through facilities of communication and movement undreamed of a generation ago.

Substituting the new slave—electricity—for sweating human labor has a profound social significance. It gives women more leisure and an opportunity to acquire more luxuries and cultural experiences. On the business side, the present clamor for things electrical means that the current demand on the part of American consumers is larger than ever before in history and is growing at the rate of 15 per cent. a year. That is the explanation of the present unprecedented prosperity of well-managed electric light and power enterprises. It indicates why the investment status of public utility securities has improved in spectacular manner. Ten commonwealths have made public utility bonds of the best type legal investments for savings banks and many more states are seriously considering taking the same step.

Push-button housekeeping is making over the American national life, giving our people far more comforts and conveniences than were ever before enjoyed by the masses. Electricity replaces servants at a time when immigration restrictions make house-workers scarce. The next great spurt will be in the popularization of refrigeration machines. The great need is a Ford who can through quantity production get the price down.

THE WORKSHOP

"HOW LONG do I have to wait for the second installment of the Sea Devil?" was an inquiry received by telephone from one of our regular readers immediately after the July issue had been published with the first installment of the thrilling tale of Count Felix von Luckner, the German blockade runner and war-time buccaneer whose story has been set down by LOWELL THOMAS, author of "With Lawrence in Arabia." We regret that the next installment cannot be presented until the August issue of the magazine, and we predict that all those who read the second installment this month will look forward to the third installment. Altogether this is one of the most absorbing, entertaining, and amusing serials we have ever printed, and—more than that—it is not without its lessons and its moral.

Our frontispiece this month is by a portrait painter new to our pages but one well-known in this country and abroad. J. VON R. QUISTGAARD is a Norwegian who has painted many of our prominent men, including Charles M. Schwab, Admiral Sims, and David F. Houston, former Secretary of the Treasury and now vice president of the American Telephone and Telegraph Company. One of his portraits of Mr. Houston hangs in the Treasury Department in Washington.

HOWARD MINGOS, who describes the "Perils of Flying the Night Air Mail" in this issue, is regarded as our best professional writer on aviation, which he is studying constantly. M. S. RUKEYSER, who writes the authorized interview with President Sloan of the Brooklyn Edison Company under the title "Putting a Heart Into a Public Utility," was formerly financial editor of *The New York Herald Tribune* and is now instructor in financial writing on the staff of the Columbia School of Journalism, and the conductor of a newspaper column in finance for the syndicate of David Lawrence. FRANK C. LOCKWOOD, author of the Personality sketch of "George VI of Arizona," is Dean of the College of Arts and Sciences in the University of Arizona. ARTHUR CHAPMAN, whose article deals with the Moffat tunnel, is a professional writer who specializes on Western subjects.

Our September issue, now taking shape in the Workshop, gives promise of being another exceptionally good issue of the magazine. The question "Where Are the Doughboys Now?" will be answered by FREDERICK PALMER, noted war correspondent and officer on General Pershing's staff in France, who, on the occasion of the meetng of the American Legion in Paris, will tell what the former members of the A.E.F. are doing to and in their country to-day. "Are Our Churches Growing?—and Why Not?" is the subject of an article by CHARLES STELZLE, president of the Church Advertising Department of the International Advertising Association, who has conducted an extensive inquiry in this field and is qualified to write as an authority. "The Man With the Iron Mask," an article by ANNE ROBESON BURR, describes the mysterious character of the late James Stillman, who built up the National City Bank into one of the largest financial institutions in the world and who, with the elder J. P. Morgan and George F. Baker, president of the First National Bank of New York, before the war formed a triumvirate which virtually controlled finance in this country. "In Darkest Labrador," by

VARICK FRISSELL, will tell in word and picture of the great resources and riches of a little known land now inhabited solely by Indians. Mr. Frissell has explored that land and is now on his way back there. MARION T. COLLEY will write of the great engineering achievement of building the Holland vehicular tunnel under the Hudson River, connecting New Jersey and New York. In the third installment from the Sea Devil LOWELL THOMAS and Count VON LUCKNER will tell of sinking allied ships on the high seas. The fourth and last article by GREGORY MASON under the general title "Has the Dollar a Heart?" will tell of the work of the dollar in Asia and the Pacific.

The articles on atheism by HOMER CROY in our May and June issues continue to call forth comment from our readers. Of the many letters that we have received, we print two below—one from Tacoma, Washington; the other from a skeptic in Eaton, Ohio.

To the Editor, WORLD'S WORK.

Sir: When you published Mr. Croy's articles on atheism, I think you intended to arouse the indignation of the Christian world, but you have done more than that. These articles have not only hurt the ideals of those Christian minds who read it, but they have also contradicted and even insulted the ideals of atheism.

When these so-called atheists organized their association they showed that they knew nothing about atheism, because, had they analyzed the reaction that their propaganda would have, they would have realized that it would either hurt the ideals of the Christian or instill in the indifferent thoughts wholly destructive concerning the loveliest tale ever written and, knowing this, they would have realized that they were only tearing down the foundation of happiness and the very essence of life of those myriads of people living yesterdays.

I might sum up the creed of the true atheist: I believe in material because, with its hypothesis, it has sound conclusion. I believe in energy because it is the embodiment of the whole. I believe only in fruitful reactions; therefore I believe nothing is wrong that does not hinder the progress of humanity. I appreciate everything because it is material.

Something, I feel, must be done to counteract this peculiar impulse of a group of persons whose level of intelligence seems almost incredible. I should advise them to read Shelley. Perhaps the very purity of his atheism will help to convince them of their ridiculousness.

HARRIETTE HOWARD.

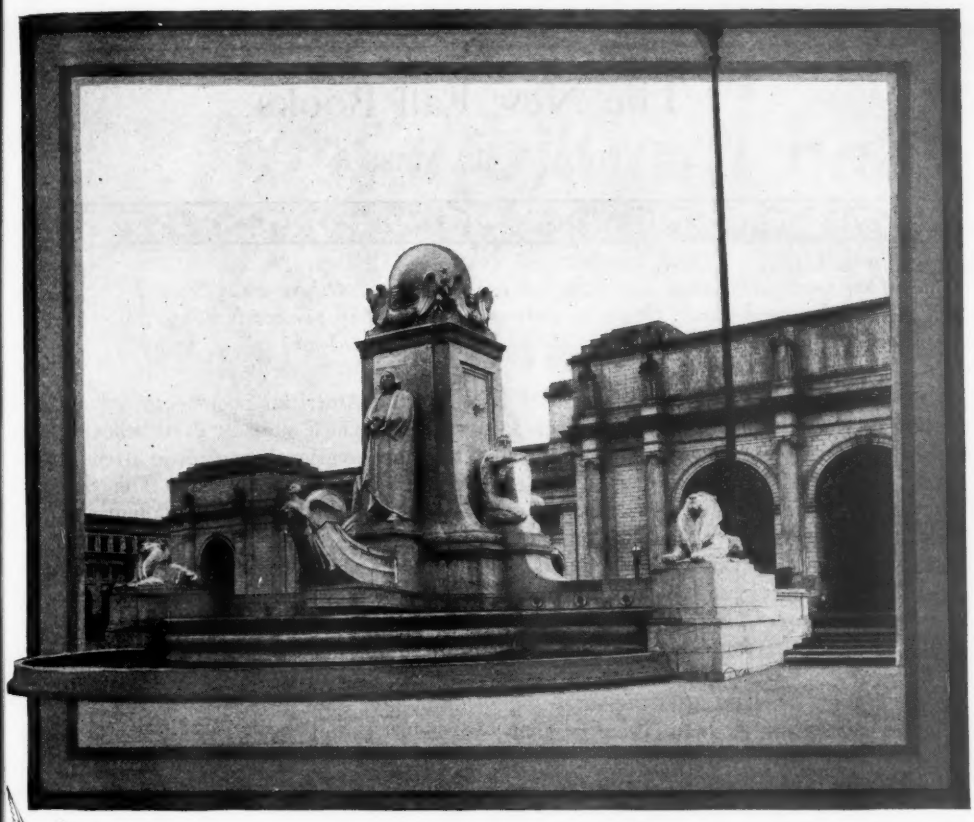
To the Editor, WORLD'S WORK.

Sir: My objection to Messrs. Smith and Hopwood is that they are too radical. They are trying to break down something orthodox, but what have they to put in its place? "Nothing," says Mr. Hopwood. But they must have something. We have been told over and over again that religion is a fundamental of human nature. How, then, will "nothing" meet that need?

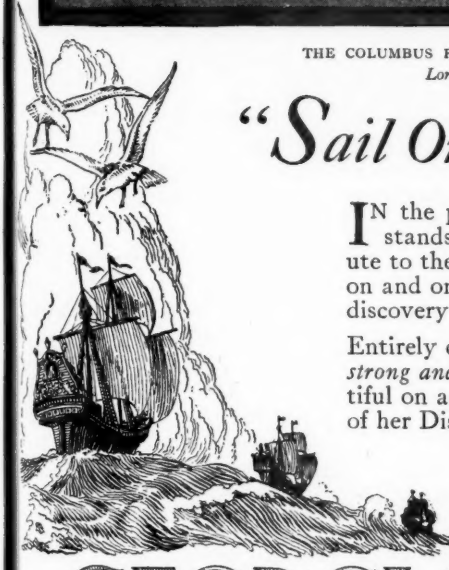
Personally, I am a skeptic. But I feel sure that there is a supreme intelligence in control of this universe. Certainly this very beautiful planetary system didn't "just happen." But as for Jesus, it takes bushels of so-called faith to believe in Him as being divine. Had Mohammedanism, Jainism, or Buddhism been the rage when civilization swept westward I believe we should now be adherents of one of those faiths.

I think the 4 A's are on the right track, but they are going at it in the wrong way. They are wrong, and the dogmatists are wrong. We should have an institution in society, to take the place of the present church, to propagate truth. But we don't need radicals; we now have enough Reds, Communists, Holy Rollers, and politicians.

L. W. SHARKEY.



THE COLUMBUS FOUNTAIN, WASHINGTON, D. C.
Lorado Taft, Sculptor



"Sail On! Sail On! and On!"

IN the plaza of the Union Station in Washington, stands the Columbus Fountain—America's tribute to the man whose courage enabled him to sail on and on in the face of unknown dangers to the discovery of the New World.

Entirely of white Georgia Marble, *made by Nature strong and enduring*, this fountain will remain beautiful on and on and on, forever reminding America of her Discoverer.

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(See ad of the National Association of Marble Dealers in this issue)

The New Fall Books

THOMAS L. MASSON

A few of the books mentioned here have just been published. Others will be issued in September. Still others a few weeks later. Owing to unrecorded changes in publication dates, it is impossible to give an exact chronology, but orders placed for any of these books can all be filled very shortly.

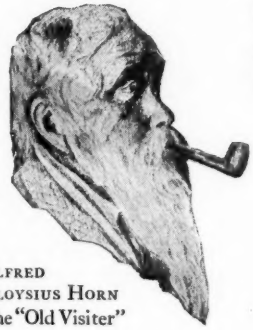
IN BOOKS, as in other human affairs, it is the unexpected that happens. We, who are about to salute you, survey the whole field "from China to Peru," rounding up the old favorites and making our estimates of the latest claimants to glory: when lo, some new planet swims into our ken unheralded and unsung. Thus came last year Margaret Kennedy's "Constant Nymph," taking the public by storm. Later came Warwick Deeping's "Sorrell & Son" and "Doomsday," both springing into the literary limelight after the author had struggled for years in semi-obscurity. Now Margaret Kennedy is continuing with her "Red Sky in the Morning" (not, however, until November) and Mr. Deeping with his "Kitty." Last year Anita Loos set the world laughing with her "Gentlemen Prefer Blondes"; this year it is going to be "But Gentlemen Marry Brunettes." H. M. Tomlinson, who yesterday made such a hit with his "Sea and Jungle," is this year trying his hand at a story: "Gallions Reach." Donald Ogden Stewart, that acidulous satirist, has turned slightly from the extreme grotesque and now produces "An American Comedy." F. Scott Fitzgerald, whose "Great Gatsby" I liked even better than his "This Side of Paradise," is out with "A New Novel." Josephine Dascam Bacon, who has been silent so long, will move us with "Counterpoint," an American character story of four personalities. Ben Ames Williams, that prolific and always good spinner of yarns, will publish this year his first novel not run as a serial—"Splendor"—why not, I wonder?

Yesterday we had the cross word puzzles and "Ask me another." Since these two best-selling memory-sops have so effectually proved that the American people are not a herd of morons (which nobody ever believed), there have been various and frantic attempts to repeat them. It cannot be done. This year, whatever happens, it will be different from anything yet.

Do not, however, despise the old favorites, while welcoming the new ones. My own personal experience is that in order to appreciate at its full value the astonishing vivacity, penetration, vividness, and really first-rate writing of to-day, I must also—as a background—go back to the old ones. I have lately been rereading Jane Austen, Dickens, and, in particular, Thackeray, and I advise any one to do this who wishes to understand the merits (and demerits) of Wells, Bennett, Wharton, Mrs. Norris, Tarkington, and many others. For one thing, we have almost completely lost our sense of leisure, and in this respect our book characters are all foreshortened. If you doubt this, compare the slow upbuilding of "Henry Esmond" with, say, Arnold Bennett's "Lord Raingo" or his forthcoming novel "The Vanguard."

This fall there are no less than three big prize winners and two of them by women. *First*, "Jalna," by Mazo De La Roche, which took the Atlantic Monthly $10,000 prize. *Second*, "Rebellion," by Mateel Howe Farnham, which took the *Pictorial Review*-Dodd, Mead $10,000 prize. Mrs. Farnham is the daughter of that apostle of common sense, E. W. Howe of Kansas. In this book the daughter shows quite plainly that her constructive ability is, in a way, a much more valuable affair than her father's distinctive jibes—he can read it with profit. *Third*, the Harper prize novel, "Grandmothers," by Glenway Wescott, of which

"I can tell a porcupine from a billiard ball!"



ALFRED ALOYSIUS HORN
The "Old Visiter"

One reviewer's unsolicited praise, explaining partially why over 3,000 people a week are buying this book.

It isn't often we quote a review as a complete "ad," but what James Saxon Childes, of The Birmingham News, says, so well expresses our own feelings about "Trader Horn" that we quote his article:

"ONCE in a while I feel as if I'd like to step into this editorial page as a clown in a circus steps through a paper hoop. Occasionally I'd like to get away from all the traditions and push aside all the barriers which separate the two of us. In other words, there are times when I'd like for you to be in my library, or for me to be on your veranda, and for the two of us to be talking. Quite honestly I wish that were the truth right now; because if you and I were together, then, probably, you'd catch some of my enthusiasm for a book I've just finished reading and perhaps I might convince you that it is one of the most delightful volumes to come my way in years—and I'm saying that without any reservations whatever.

"It is the—what—amazing—charming—gripping—all that and more, volume called 'Trader Horn,' a true story of a real man's actual experience in some 60 years of life in Africa.

"NOW I'm quite aware you think most reviewers praise any and every book, and that more than often they write that praise without having read anything more than the blurb which is printed on the dust wrapper. But in this case I solemnly vow I've read every word of 'Trader Horn.' I further vow that I found vast entertainment, a thousand little tidbits of quaint philosophy, numberless sidelights on famous men, and instructions about the ways of men and beasts in Africa such as has never been my privilege before. I still further promise and vow that I shall read 'Trader Horn' at least once more; for I'm certain that with only one reading I by no means drained all its wisdom.

"IF you think I'm getting too strong in my praise, or if I'm taking up too much space, then I'm sorry. *But I can tell a porcupine from a billiard ball, and 'Trader Horn' is a great book.* I'm telling you, and if you don't read it you're cheating yourself.

"Now if you were here in my library I could show you the book, show you a picture of the bearded old trader, read you passages too long to quote in this column, and I'll stake my last dime that I could get you as keyed up over 'Trader Horn' as I was when I finished it, and as I am while I'm writing about it. Furthermore, I'm certain I'd have you running to the nearest book shop to get a copy—but since you and I are not together you'll probably toss aside this paper and forget about 'Trader Horn' published by Simon and Schuster, and thus you'll cheat yourself of several hours of keenest entertainment and days and days of most pleasant memory."

At all bookstores—Price $4.00

TRADER HORN

being the life and works of ALFRED ALOYSIUS HORN

An "Old Visiter" . . . the words written by himself at the age of 73 and the life, with such of his philosophy as is the gift of age and experience taken down here and edited by Ethelreda Lewis. With a foreword by John Galsworthy.

SIMON AND SCHUSTER, *Publishers*, 37 West 57th Street, New York

the publishers remark that it was judged entirely on its literary merits and not with one eye on the movies. Bravo!

In biography there is Norman Hapgood's life of Al Smith "Up from the City Streets" —how singular that it should now be issued on the eve of a Presidential campaign! But the title of it should be changed to "We know you, Al." There are four books on Napoleon, to wit: "Napoleon in Captivity," by Count Balmain (who was with him, I believe); "Napoleon and His Women Friends," by Gertrude Aretz; and "Those Quarrelsome Napoleons," by Robert Gordon Anderson. The first two are translations, the third is the more readable. And the fourth is "The Thunderer," by E. Barrington, who wrote that fascinating volume "The Divine Lady." There are two books on Lincoln: "The Women Lincoln Loved," by William E. Barton, and "Lincoln and the Railroads," by John W. Star, Jr. I think Mr. Barton has already shot his bolt about Lincoln. I suspect Mr. Star has some good material in his book. In "Washington Speaks for Himself," Lucretia Percy Osborn has excellently emulated the example set last year in Stephenson's autobiography of Lincoln and produced a valuable and interesting source book; and in the "Estate of George Washington, Deceased," Eugene E. Prussing has also

What I Am Reading—and Why

The WORLD'S WORK *herewith presents further comments from prominent men and women telling what they are reading and why. If the enthusiasm with which previous statements have been greeted is an indication, the editors are right in believing that this innovation in book reviewing, which presents opinions from capable persons who read what they want and not what they are obliged to review, gives valuable hints as to what is worth while in books recently published.*

HERBERT ADAMS GIBBONS, STUDENT OF INTERNATIONAL RELATIONS—Since the beginning of 1927, I have spent a good deal of time stretched out in a steamer chair on ocean liners and huddled in the corner of European trains. Much of my reading has been in French. In English, aside from mystery stories (I read everything that J. S. Fletcher and E. Phillips Oppenheim write), I have been particularly interested in books on contemporary Italy. "Italy and Fascismo," by Don Luigi Sturzo, has proved the most stimulating. I have also read an exceedingly interesting book by Charles E. Chapman, called "A History of the Cuban Republic." Two outstanding spring books on Franco-American relations, quite different in treatment but both thought-provoking, have attracted me: "Before the Obstacle," by Tardieu, and "America Comes of Age," by Siegfried. I have also read the last two volumes of Churchill's "The World Crisis" and Fisher's excellent biography of Lord Bryce. And for the soul, much rereading of Robert Louis Stevenson.

Herbert Adams Gibbons

WALLACE WALTER ATWOOD, PRESIDENT OF CLARK UNIVERSITY—My professional interests lead me naturally to read periodical literature which will help keep me in touch with what is going on in various parts of the world. I depend upon *The Literary Digest*, WORLD'S WORK, *The Living Age*, *Economic Geography*, *Foreign Affairs*, and *The Outlook*.

Of late I have been especially interested in reading about Oriental countries. "The Daughter of the Samurai" has pleased me immensely as an intimate picture of high class Japanese life, McGowen's "Outline of the History of China" has proven to be very interesting at this time, also Williams's book on "China Yesterday and To-day." However, I have found time to read much of Bishop Lawrence's "Memories of a Happy Life," and I have turned with special interest at this time to a translation of the Books of Confucius. "Beau Geste" is the only story that I have read through for some years. Most of those that I look at fail to hold my attention.

Wallace W. Atwood

LEE DEFOREST, INVENTOR—In addition to keeping up with the electrical and radio journals, I am now reading Bryan's "Edison," a brief life of Chopin, and the poems of Allan Seeger, Poe, and the Rubaiyat. I seem never to find time or interest to read modern American fiction such as "Main Street," "Babbitt," "Elmer Gantry." I tried "Helen of Troy," but she was altogether too wordy and deliberate.

Lee de Forest

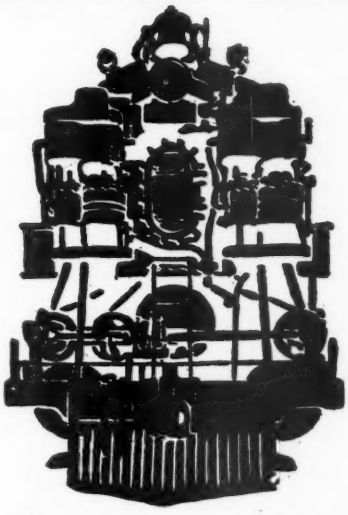
DANIEL CARTER BEARD, ARTIST AND AUTHOR—Books of philosophy, Emmanuel Swedenborg, the Bible, geology, botany, and natural history, Americana, Indians, history relating to manners and customs of American pioneers, Robert Service's poems, wild western stories; *New York Times* and *New York Herald Tribune*, magazine sections; *Boys' Life*, *American Boy*, *Forest and Forest Life*, and all publications relating to scouting and nature. As far as possible I avoid reading unclean stories or witnessing unclean plays, deeming moral filth more disgusting than physical filth.

Daniel C. Beard

TRAINS, TRACKS AND TRAVEL

T. W. VAN METRE

"The book answers most of the questions curious youngsters are prone to ask about railroads, and illustrates these answers with more than 200 pictures."
—*The Traffic World*



"Professor Van Metre has made a fascinating book out of railroading."
—*Brooklyn Daily Eagle*

For boys from eight to eighty

"TO write a book all about engines and trains and ways and means of making them go in such a manner that little boys can understand, and older people be interested, is a feat. Mr. Van Metre started, one understands from his comments, merely to instruct his own small son about what he himself is deeply concerned with. But the talk grew into this book. And here is a whole field covered, and well covered. At the outset we have a pleasant little discourse about the primitive means of traveling. Some of us recall the discomforts of by-gone days when all trains journeyed experimentally, and timid people rode in fear and trembling. He shows what this meant by pictures and then adroitly contrasts them with the luxurious and splendidly appointed Pullmans of modern days. We take things so much for granted that it is almost a shock to pass through the evolution of the railroads in our country. Mr. Van Metre leaves nothing to the imagination, but gives facts with a patient array of detail that admits of no mistakes being made by his listeners. He writes colloquially, as though talking to a small boy; yet there is no puerility in his treatise, which is a thorough exposition of all the phases of tracklaying, train conducting, railway management and even the care and preservation of machinery. A sound, truthful book on a subject almost every young boy and many older persons will delight to read about."
—*The New York Times*

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made a distinctive contribution to the literature of the father of his country. During the past year you may have read Emil Ludwig's "Napoleon" and "William of Hohenzollern"; you will now have the opportunity of reading his "Bismarck." And if you have read a book called "This Believing World," by Lewis Browne, and happen to be interested in "The Man Heine," you will be delighted by the style.

Among personal reminiscences I must here note George Arliss's (and a delightful chap he is) book of theatrical biography, "Up the Years from Bloomsbury," Feodor Ivandvitch Chaliapin's "Pages from My Life," Letters of Mme. De Sévigné, "My Life as an Explorer," by Roald Amundsen, and "My Life in Advertising," by Claude C. Hopkins—this last in particular, as there is nothing more interesting in America than advertising, except women and golf. Then again, there is a life of Joe Cannon by Mr. Busbey; the first volume of a definitive life to come of Woodrow Wilson by Ray Stannard Baker, a life of Shelley in two volumes by Walter Peach, one of Tobias Smollett by Lewis Melville, and a book about D. L. Moody by that voluminous but always interesting biographer, Gamaliel Bradford, called "A Worker in Souls." (If Moody were alive to-day, he would doubtless be classified by Mencken and Sinclair Lewis as a worker *of* souls.) Then there is a ribald book about William Randolph Hearst by John K. Winkler, most of which has appeared already in *The New Yorker*. Lastly, there is a history of the old Commodore Vanderbilt by Arthur D. Howden Smith.

If you are interested in the machinery of our minds, then read two books by our most notable psychologists: "The Conduct of Life," by William McDougall, and "The Public and Its Problems," by John Dewey. And Dr. Sigmund Freud, who seems to have located an inferiority complex in everybody except literary critics, caddy masters, and women editors, is out with "Psychoanalysis for Every One," while Bertrand Russell, who in October is making his annual farewell lecture beantour of America, has out two books, one of which is called "Philosophy." Mr. Russell, by the way, was at one time an associate of that other great (although somewhat cryptic) writer on mathematics, religion, science, and philosophy—namely, Alfred North Whitehead, whose "Lectures on Symbolism" will interest those students of religion and science who flatter themselves they know what he is driving at.

So far, in the field of fiction, we miss some of our oldest friends. John Galsworthy appears to be issuing nothing but a play ("The Escape"), and where among English novelists are Sheila Kaye-Smith, Rose Macaulay, and the redoubtable Rebecca West, who, since her admirable "The Judge," appears to have been swamped with orders for minor magazine articles. As for our own writers, Louis Bromfield is out with "A Good Woman," a character study fully equal to his prize-winner "Early Autumn" last year. In "Growth,"

Books About Books and Authors

The service which the WORLD'S WORK *instituted several months ago, of supplying its readers with copies of brochures issued by the different publishers, has become so popular, that we have made arrangements to supply a larger number of these booklets, as listed below.*

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Thomas Burke
Frances Hodgson Burnett
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Padraic Colum
Joseph Conrad
Theodore Dreiser
Jeffery Farnol
Edna Ferber
Harry A. Franck
Robert Frost
Ellen Glasgow
David Grayson
Cosmo Hamilton
O. Henry
Du Bose Heyward
A. S. M. Hutchinson
Owen Johnson
Rudyard Kipling
Selma Lagerlöf
Sinclair Lewis
Hugh Lofting
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Edison Marshall
John Masefield
W. Somerset Maugham
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Louise Jordan Miln
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Charles G. Norris,
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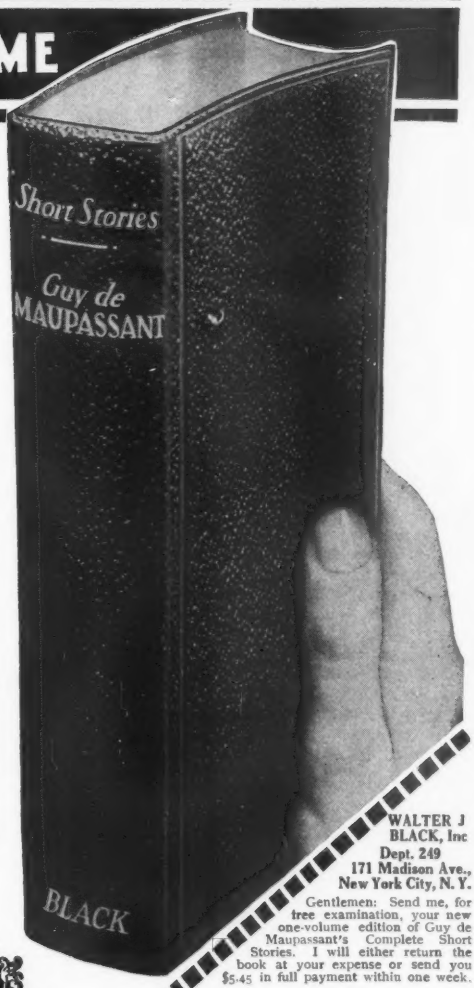
The Charm Dispelled
A Little Walk
A Dead Woman's Secret
Bed No. 29
Doubtful Happiness
After Death
Room No. 11
The Tobacco Shop
A Passion
Regret
The False Gems
A Useful House
Was It a Dream?

Boule de Suif
The Diamond Necklace
The Story of a Farm Girl
Love
Ugly
The Hole
A Family
Bertha
A Mesalliance
The Carter's Wench
The Bed
A Way to Wealth
Forbidden Fruit
Madame Parisse
A Wife's Confession
Love's Awakening
Women's Wiles
The Wedding Night
On Cats
One Phase of Love
A Poor Girl
Caught
Magnetism
Countess Satan
The New Sensation

The Thief
The Diary of a Madman
In His Sweetheart's Livery
Lost
Margot's Tapers
Waiter, a Bock!
The Mad Woman
Virtue in the Ballet
Fecundity
Words of Love
The Impolite Sex
The Farmer's Wife
On Perfumes
An Unfortunate Likeness
A Rupture
The Lost Step
The Artist's Wife
The Rendezvous
A Fashionable Woman
An Old Maid
The Love of Long Ago
A Queer Night in Paris
Ghosts



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Booth Tarkington is doing much as Galsworthy did in his "Forsyte Saga," and Willa Cather ("Death Comes for the Archbishop"), Thomas Beer ("The Road to Heaven"), and Kathleen Norris ("Barberry Bush") hold up the American standard. H. G. Wells, of course, in "Meanwhile"! I suspect that the real trouble with this distinguished person is that he writes not always so wisely but too much Wells. His latest book, however, is shorter than his "World of William Clissold," which I don't think many people have read through.

Just now space forbids my mentioning even a respectable number of titles among the novels forthcoming, but I venture the prediction that this fall the number of good novels will exceed those of any other season in our publishing history.

Fifty of the Best Fall Books

Character Novels

A Good Woman, by Louis Bromfield. Stokes. $2.50
The Vanguard, by Arnold Bennett. Doran. $2.
Growth, by Booth Tarkington. Doubleday, Page. $2.50
Gallions Reach, by H. M. Tomlinson. Harper, $2.50
The Grandmothers, by Glenway Wescott. Harper. $2.50
Death Comes for the Archbishop, by Willa Cather. Knopf. $2.50
Rebellion, by Mateel Howe Farnham. Dodd, Mead. $2.
The Mad Professor, by Hermann Sudermann. Boni & Liveright. 2 vols. $5
Conflict, by Oliver Prouty. Houghton, Miffin, $2
Jalna, by Mazo De La Roche. Little, Brown. $2
Zelda Marsh, by Charles G. Norris. Dutton. $2.50
The Mad Carews, by Martha Ostenso. Dodd, Mead. $2.50

Mystery, Adventure, Romance

The Canary Murder Case, by S. S. Van Dine. Scribner. $2
The Nuptials of Corbigny, by Rafael Sabatini. Houghton, Mifflin. $2.50
The Passenger to Folkstone, by J. S. Fletcher. Knopf. $2
The Haunted House, by Hilaire Belloc. Harper. $2.50
The Secret Fool, by Victor MacClure. Brentano. $2
Murder in the Maze, by J. J. Connington. Little, Brown. $2
Road End, by Woods Morrison. Putnam.

Travel

European Skyways, by Lowell Thomas. Houghton, Mifflin. $5
The Story of Everest, by Captain John Noel. Little, Brown. $4
Passenger to Teheran, by V. Sackville-West. Doran. $4
Across Asia's Snows and Deserts, by William J. Morden. Putnam. $5.
On the Steppes: A Russian Diary, by James N. Rosenberg. Knopf. $2.50

Biography and Memoirs

Joseph Conrad: His Life and Letters, by G. Jean Aubry. Doubleday, Page. 2 vols. $10
Uncle Joe Cannon, by L. White Busbey. Holt. $5
"We," by Charles A. Lindbergh. Putnam. $2.50
Up from the City Streets: Alfred E. Smith, by Norman Hapgood and Henry Moskowitz. Harcourt, Brace. $2.50
George Sand: the Search for Love, by Marie Jenney Howe. Day. $5
Commodore Vanderbilt, by Arthur D. Howden Smith. McBride. $5

All American

The Gateway to American History, by Randolph G. Adams. Little, Brown. $3
Potomac Packet, by H. G. Dwight. Harper. $3.50
Cow Country, by Will James. Scribner. $3.50
America, by Hendrik Willem Van Loon. Boni & Liveright. $5
The Rise of American Civilization, by Charles A. and Mary R. Beard. Macmillan. 2 vols. $12.50
The Public and Its Problems, by John Dewey. Holt. $2.50
My Life in Advertising, by Claude C. Hopkins. Harper. $3
Your Money's Worth, by Stuart Chase and F. J. Schlink. Macmillan.
The Re-making of an American, by Elizabeth Banks. Doran. $5

International

The Chinese Situation, by Arthur Ransome. Houghton, Mifflin, $2
Origins of the World War, by Sidney B. Fay. Macmillan. 2 vols. $10

Miscellaneous

The Conduct of Life, by William McDougall. Putnam.
Lectures on Symbolism, by Alfred North Whitehead. Macmillan.
The Art of Theatre-Going, by John Drinkwater. Houghton, Mifflin. $3.
Science and Human Progress, by Sir Oliver Lodge. Doran. $2
Heredity and Human Affairs, by Edward M. East. Scribner. $3.50
Books and Bidders, by Dr. A. S. W. Rosenbach. Little, Brown. $5
The Children's Reading, by Frances Jenkins Olcott. Houghton, Mifflin. $2
Cities and Men, by Ludwig Lewisohn. Harper. $2.50

THE AMERICAN MERCURY

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In spite of its youth THE AMERICAN MERCURY has the critical attitude of maturity: H. L. Mencken, its editor, is responsible for that. He is dependable security against smugness, dullness, and stupidity. And moreover, according to Walter Lippman, he is "the most powerful personal influence in this whole generation of educated people."

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INVESTMENT MARKETS

This department offers a meeting place for readers and bankers. Bankers who wish to use these pages are investigated by us, and each advertisement is supervised before acceptance. We make every effort to accept only the offerings of safe securities and the announcements of responsible and reliable banking houses.

IN THE SPRING of 1920 the writer of these articles had an interview with the treasurer of one of the largest life insurance companies about investments. One of the things this treasurer said was that he would not buy any railroad bonds because he was afraid of them. In making use of the interview the writer left out this reference to railroad bonds. He had a feeling that if the treasurer was sincere his fear was unfounded and that he was very likely to change his view before long. To put him on record as he had expressed himself might not have correctly represented his opinion by the time the interview was published and in that case he would be misrepresented to the public and investors would be caused unnecessary alarm.

As a matter of fact, this insurance company treasurer did change his view and it has been insurance-company, as well as public, buying that has sent such high grade railroad securities as Atchison, Topeka & Santa Fe Railway general mortgage bonds up from a price of 70½ in April, 1920, to 97⅜ this year. In other words, the view of an experienced banker quoted in these pages in the spring of 1926 that high grade railroad bonds seem likely to sell on a 4 per cent. yield basis has practically been fulfilled.

This earlier apprehension of the insurance company treasurer can properly be referred to now as an example of how lack of faith in a fundamental industry of this growing country, or more particulary lack of faith in the inherent fairness of the American people, may cause one to miss sound investment opportunities. It was in 1920 that Congress passed the Transportation Act, which fixed a "fair rate of return" which the railroads were entitled to earn. Operating under this act, the railroads for the past few years have been making good progress. It took investors some time to interpret the advantages of this act to them, but they are now doing so. Not only the prices of railroad bonds but also the prices of railroad stocks show this. As is generally the case, investors and speculators will probably overestimate these advantages and many will buy at high prices that will not be maintained.

The soundness of the railroad financial structure taken as a whole was recently pointed out by Fred W. Sargent, president of the Chicago & Northwestern Railway, in an article in the *Savings Bank Journal*. He brought out that while the total tentative value of our railroads, as fixed by the Interstate Commerce Commission for rate-making purposes, is at least $22,900,000,000, the total amount of railroad bonds of all classes outstanding in the hands of the public is only $11,300,000,000, or less than half. This, of course, does not mean that all railroad bonds are necessarily safe investments. As Mr. Sargent showed, other factors besides property value, such as earning power and adequate maintenance, enter into the investment value of railroad securities.

Since the passage of the Transportation Act in 1920 this magazine has repeatedly referred to the more favorable outlook for the railroads. At present it seems wise to caution investors against becoming too enthusiastic over the outlook.

Hugh Gibson
American Diplomat